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University of Alberta

**Ecological Participatory Action Research (EPAR): an approach appropriate to the
study and encouragement of urban farming for a new model of Community
Development in El Salvador.**

by

Idalia Ivon Pereira



**A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfilment
of the requirements for the degree of Master of Science**

Department of Human Ecology

Edmonton, Alberta

Fall, 2001

University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to Faculty of Graduate Studies and Research for acceptance, a thesis entitled *Ecological Participatory Action Research (EPAR): an approach appropriate to the study and encouragement of urban farming for a new model of Community Development in El Salvador* by Idalia Ivon Pereira in partial fulfilment of the requirements for the degree of Master of Science in Human Ecology.

Abstract

Using the Ecological Participatory Action Research (EPAR) model, the research presented in this thesis elicited relevant information that urban farmers in El Salvador can use for the successful development of their communities. The thesis explains and develops the EPAR model as well as the factors that enabled nine families from three communities of San Salvador to succeed in urban farming. EPAR is a collaborative grass-roots research/development approach that takes into account actual, local circumstances, the previous experiences of the participants and the context in which they live, and shapes itself around the needs of the community. The data collected reveal that participants cultivate 210 varieties of plants using their indigenous knowledge, beliefs and philosophies, combining modern with traditional knowledge. Sixty-four plants are processed to produce food and natural medicines. During the fieldwork process, the participants created innovative plant-based development initiatives, inspired by the EPAR process and the new knowledge generated by EPAR.

Foreword

I had one of the most fascinating and personally fulfilling experiences of my life while executing this research project. The research process allowed me to connect, bridge, and mediate among cultures, organizations, individuals, and environments. Moreover, it made feel connected with all natural elements. It was a spiritual experience, in which I felt as part of a WHOLE. I am a sociologist with extensive business training. I have a diploma in multicultural therapy counselling and I have more than 20 years of experience in the project cycle of community development (which includes research, planning, monitoring, and evaluation), using participatory research methods. Before this research, I thought I had nothing left to learn about research and development. But I was wrong. I needed, and I still need, to learn. During the four months of the research, I learned that a community is more than just people. It is people intrinsically interconnected with their environments. We cannot talk about community development by thinking only of the economic aspects. There is more to it. Culture and history, to name two, are essential components.

The experience gave me a holistic understanding of environmental and poverty problems as well as of the need to end confrontations and start a process of coordination that will allow the feeding of all people of the present generations without jeopardizing the resources of future generations. The gaps between rich and poor, North and South, traditional and moderns, majorities and minorities, are not avoidable, but we need to find a solution. Working with nine families during the fieldwork made me realize two things: current community development models increase the gaps previously mentioned and indigenous knowledge is a plausible baseline for the creation of community development initiatives to shrink those gaps. The research presented in this thesis increased my ability, theoretical and practical, to perform my job as a community developer.

Dedication

I dedicate this thesis to God, present in the poorest of the poor of my former country, El Salvador, who through their suffering, inspired the themes of this thesis and motivated me to carry out this research. This thesis is also dedicated to many Salvadoran people that helped me to complete this study and whose knowledge, beliefs and philosophies are included in this thesis. To Juanita, Miguel, Laurita, Tránsito, Ricardo, Santos, Virginia, Rosa Emérita, Nidia and their families because this study would not be possible without your love and trust in me. Your faith and hope that things can be changed for the well being of our people was my inspiration. Your friendship, cooperation and patience in teaching me and sharing your experience have been highly appreciated.

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I also want to express my gratitude to the staff and members of the Asociación El Bálsamo (Balsam Association) of El Salvador, ADIPRON, specially Duban, the Urban Agriculture Network, the Micro-entrepreneur Network of El Salvador, the Garden Institute of Alberta, and the Alberta Institute for Grass-Roots Community Initiatives for their valuable support.

I am truly thankful to my supervisor Dr. Sandra Niessen for her guidance and support, providing me with her expertise, inspiration and friendship. Thanks to Drs. Nancy Gibson and Naomi Krogman for their insightful comments and inputs, and their enthusiasm about my research. Thanks to all my instructors and professors of the Department of Human Ecology, who throughout different courses helped to shape this research and pre-design the research/development process. To the staff of the Department, specially Linda, Errol and Angie; and to the graduate students, specially to Caroline and Heloisa, for providing me with advise and technical support.

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I give thanks to my father Andres (deceased), who during his short life always encouraged me to be in a permanent learning process; to my mother María Eladia, whose prayers are always with me; to my siblings, nephews, and nieces for their encouragement and belief in me. I would like to specially thank Norma, Allan, Ernesto, Xenia, Victor, and Julia María for providing me with bibliography, information relevant to this research, and practical and technical support.

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I would like to give a very special thanks to all of our ancestors and the people who have lived life before us. It is through their experience in harnessing the resources of our planet that we have come to where we are now, and is through them that indigenous knowledge is created. Without them, neither the subjects nor the objects of the research would exist, and thus it is to them that I owe thanks for the knowledge that they have left for me.

Finally, thanks to all people that due to limited space I am unable to name; you all are in my heart and prayers. God blesses you and compensates for your love and support.

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Chapter One: Introduction

On October 11, 2000, 45 people attended a day long conference at Asociacion El Balsamo/The Balsam Association (Balsam)¹ in El Salvador (see Figure 1.1) to share research findings and new knowledge gained during the fieldwork that was conducted for the purpose of the research that is documented in this thesis. Twelve of these people were participants of this study who, on that day, got up before dawn to cook traditional food using the ethnic crops produced in their yards. From 7:00 a.m. to 9:00 a.m., some Balsam's employees picked them up and drove them to the Balsam meeting place while other Balsam's employees and community members decorated the room with ethnic plants and plant-based products. Rural and urban community leaders, non government organizations (NGOs) representatives, and agronomists from the Universidad Nacional de El Salvador (UES)/National University of El Salvador participated in the conference, learnt about the research findings and offered their feedback. This event was more than a conference; it was a celebration of learning, an expression of the empowerment gained by the participants during the field/development work, and an expression of the commitment to use the new knowledge and empowerment in building stronger communities through sustainable urban agriculture. That same research is documented in this thesis.

¹ The Balsam Association of El Salvador is a non-profit, non-denominational NGO established in November 1990. It is dedicated to support the sustainable development of micro-entrepreneurs, particularly focused on women entrepreneurs. Balsam considers that sustainable development is a way to enhance family well being through the development of economic activities that respect and protect the community natural environment. Balsam's expertise is in building micro-entrepreneurs' capacities through research, education and financing. Through its activities, Balsam has established permanent relationship with community development associations, helping them to raise their members' living standards. Balsam has worked with funding agencies from Spain, Sweden, Switzerland, Ireland, and the European Union.



Figure 1.1: Urban Agriculture and Biodiversity Conference, October 11, 2000

Photo Credit: Idalia Ivon Pereira

From her experience evaluating agricultural micro-business projects in rural areas of El Salvador (1995-1997), the researcher learnt that most of these projects failed because there was no positive balance between cost and production. Two main environmental² problems were found: soil deterioration and low plant diversity. Land was yielding less and less over time while peasants continued to base their nutritional intakes on corn and beans. To them, low production of corn and beans means having neither food nor a source of income to buy food. Peasants struggled

² In this thesis, unless otherwise specified, “environment” refers to the natural, physical, and biological context and the natural resources used in urban agriculture. To refer to the other environments, an adjective is added, for example, social environment, political environment, etc.

to meet their nutritional needs, and to learn how to solve the environmental problems previously mentioned.

The researcher learnt that sustaining the physical environment, especially soil and plant diversity, is crucial for farmers to produce their food and generate income, two important aspects in developing their families and communities. Thus, the researcher defined a concept of success in urban farming that meets Salvadoran small farmers' needs. Success in this research is understood as: the ability of urban farmers to produce organic crops and generate income through plant-based micro-business, conserving plant biodiversity and soil fertility in small plot of lands. The research focused on families who represent this definition of success³. The research considered success factors including cultural and agricultural practices, and organisation of family members around farming activities.

The present study includes the Ecological Participatory Action Research (EPAR) as a model for contributing to creating community development through urban farming. The thesis includes a description and evaluation of the EPAR as well as information collected, analysed, and documented not only to meet the requirements of the degree program, but also for its use by the participating communities. The EPAR model may help these communities to achieve their goals. In addition, the study combines research and development because it encourages participants to work on self development while participating in the research process.

The information presented in this thesis is based on participatory fieldwork that took place, applying the EPAR model, from June to October 2000 in the communities of San José Cortez, Mireya II, and El Limon of the Department of San Salvador, El Salvador, Central

³ This research does not address reasons for failure in urban farmers due to two things. First, researcher interest focused on positive aspects of Salvadoran; and second, four months of fieldwork were not enough to cover positive and negative aspects. Further research could be compared with the present research findings. However, the researcher knows, from her experience working in community development in El Salvador, that most of the reasons for failure are related to the loss of traditional knowledge due to new knowledge impact and acculturation.

America. Nine community leaders and their families from the three communities, all of whom were supported by Balsam, and have succeeded in urban farming, participated in the research.

In this thesis, the graduate student is referred to as the researcher, except when referring to her work applying the EPAR model, and the members of the nine families from the three communities investigated are referred as to the research/development participants. The real names of the research/development participants are used with their assent because they believe their experience, knowledge, and beliefs might be applicable to other communities. They would also like to establish partnerships or links between Salvadorans and Canadians to support each other in their efforts of development.

Background of this Research Project

Balsam, the Micro-Entrepreneur Network (MN)⁴, and The Garden Institute of Alberta (GI)⁵ were contacted in January 1999 by the researcher. Representatives from these organizations and the researcher shared their motivations, interests, experiences, and knowledge. The three groups supported the research idea, initiating a partnership to create and develop the Building on Biodiversity (BOB) project, which was designed to be carried out in both Canada and El Salvador. The goal of this project is to help micro-entrepreneurs use their indigenous agricultural knowledge and approaches to develop plant-based micro-industries as a way to alleviate their economic and environmental problems. The BOB project included four components of which this research is the fourth (see Figure 1.2).

⁴Organization of micro-entrepreneurs supported by Balsam.

⁵ **The Garden Institute of Alberta** is a charitable non profit organization, established in 1998, dedicated to promoting organic urban agriculture and gardening, and community development through grassroots initiatives in traditional knowledge documentation and the conservation of biodiversity including food crops.

The first component is called BOB-El Salvador in Edmonton. It was developed with/for Salvadoran families living in Edmonton to be carried out in Edmonton. The second component's name is Building Connections for an Urban Agriculture System, which was developed in El Salvador with the support of the GI. The information collected in Edmonton and in El Salvador during the first two components facilitated the development of the third component, called BOB Exploratory Phase. It was developed in El Salvador to explore conditions and resources to expand the project among communities. The researcher inspired the BOB project and was the first coordinator, thus she was in charge of obtaining funding through GI. The different components of the project were developed once funding was obtained.

First Component: BOB – El Salvador in Edmonton

This component was carried out in Edmonton from August 1999 to June 2000. The goal of this component was to search for the agricultural knowledge of Salvadorans who live in Edmonton and explore their interest in supporting the BOB project idea. It included four activities as follows:

- A Participatory Action Research (PAR) workshop. This workshop was organized and facilitated in November 21-22 1999 by the researcher in collaboration with a research team and several professionals, including other members of the GI. The seminar was developed with the collaboration of two professors and two graduate students from the department of Human Ecology, University of Alberta. The most significant product of the workshop was the recognition that the participants could better understand the problems of sustainability and biodiversity in relation to poverty with the help of the topics included. They came out of the workshop with a true desire to solve these problems. They validated the research idea incorporated in the present study as an important tool to solve those problems.

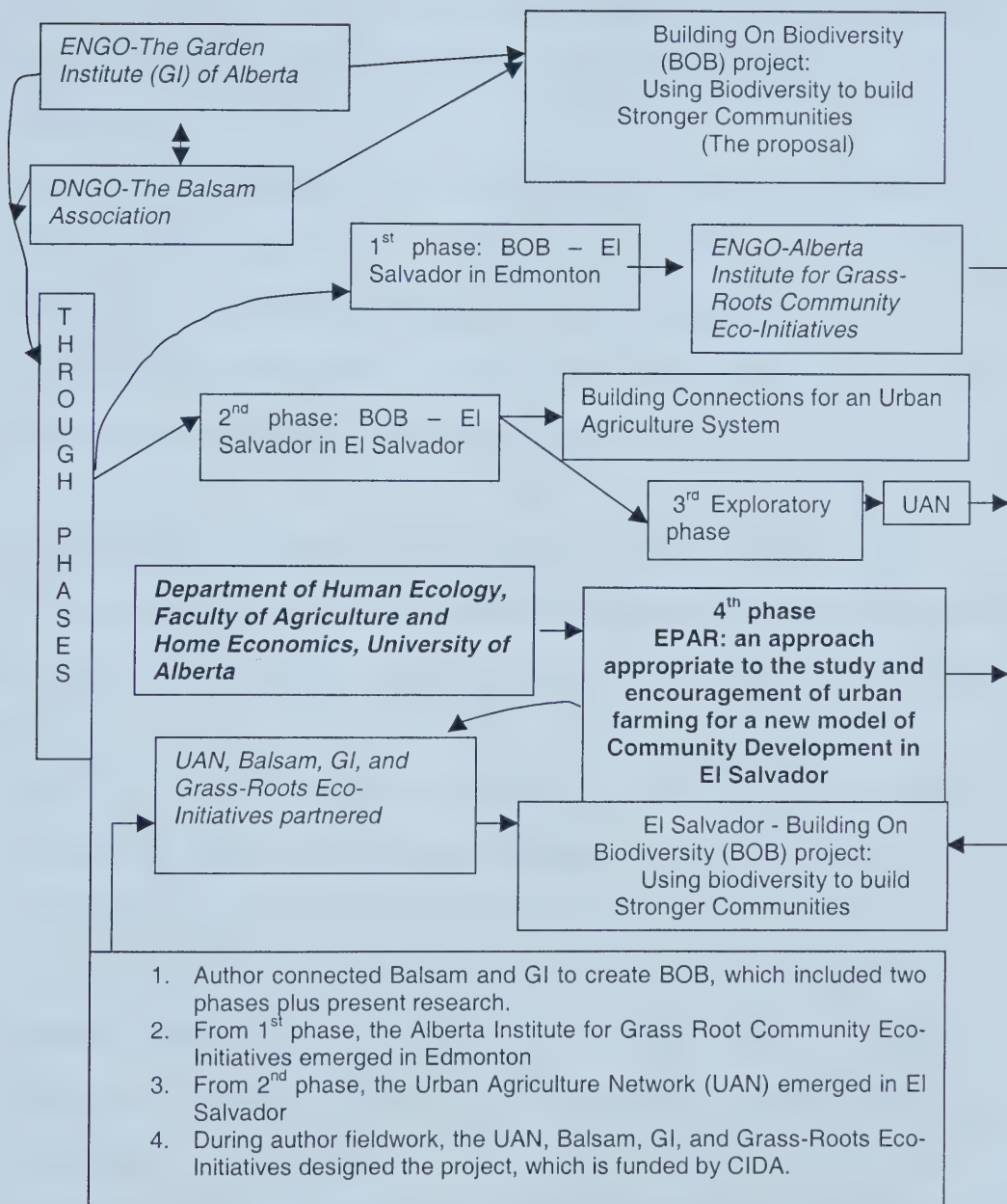


Figure 1.2 BOB phases

- Salvadoran Agricultural Traditional Knowledge Documentation. Agricultural knowledge of Salvadoran residents in Alberta was investigated. Its application in urban agriculture and ways to interchange knowledge and approaches with micro-entrepreneurs in El Salvador was also studied.
- Alberta Institute for Grass-Roots Community Eco-Initiatives (Grass-Roots Eco-Initiatives). This NGO that was created by the researcher with the help of members of each of the communities investigated using a Participatory Action Research approach.
- Community development process in Edmonton. Grass-Roots Eco-Initiatives started a plant-based community development process guided by the researcher.

Second Component: Building Connections for an Urban Agriculture System in El Salvador

This component includes four activities developed by Balsam, supported by the GI and advised by the researcher. These activities were carried out between March and June 2000 as follows:

- Assessment of Needs. Institutional and community strengths and weaknesses for urban agriculture and opportunities and barriers to community development based on plants and their uses were studied and evaluated.
- Urban Agriculture Network. It was created by the participants and Balsam staff during the assessment process using the Participatory Action Research approach. Community organizations, Soyapango and Mejicanos city governments, and three NGOs were represented.
- Participatory Action Research (PAR) and Urban Agriculture training. It was implemented to enhance the skills and knowledge of the members of the new network. In this workshop, presenters and audience discussed environmental problems and their relation to poverty, and suggested potential solutions.

- A Three-year Strategic Plan. It was developed by Balsam and the newly trained network. Balsam and GI would continue developing the BOB project based on this plan.

Third Component: BOB Exploratory Phase in El Salvador

This BOB component was also part of the researcher's fieldwork exploration. Representing the GI, the researcher travelled with a soil scientist to El Salvador in April 2000 and carried out the following activities:

- Meeting Urban Agriculture Network's Representatives to present and negotiate BOB project goals, which included the research goals of the present thesis, defining collaborative alternative sustainable solutions to the different communities' needs identified by Balsam during the assessment of needs.
- Environmental Site Assessment of four gardens plots selected by the urban agriculture network to create model gardens for training micro-entrepreneurs on urban farming and biodiversity. Preliminary results of this assessment were presented in the PAR and urban agriculture workshop where the researcher was a presenter.

Important factors found during the exploratory phase were the loss of biodiversity of plants and insufficient water supplies. Community members also emphasised the problem of access to traditional seeds and planting materials. Other people commented about the risk of disappearance of national corn, beans, fruit, and other vegetable varieties. Most of the dietary food crops are imported from other countries, mostly from Guatemala and Mexico, and most people have limited resources to buy them. Thus, people recognised that through the development of urban agriculture they would be able to grow diverse plants that currently are in danger of extinction, learn and apply new knowledge to reclaim and maintain soil fertility, and efficiently manage the available water.

During this exploratory phase, the urban agriculture network validated this research as an important tool for searching for solutions to their problems. It also supported the researcher in selecting the communities and families to participate during the fieldwork in El Salvador. The exploratory phase was then, an opportunity for the researcher to meet the potential participants.

Fourth component: Research/Development project

The research presented here has been developed to provide the BOB project with a method and new knowledge for urban farmers to work on their own development in which they are able to produce food, increase income and protect the environment, improving their well being.

Justification of the Research/Development

Poverty and environmental problems in El Salvador are the result of economic and political structures that have been in place for many decades, problems that historically have been addressed violently and increased by natural disasters⁶. This research is an attempt to search for grass-roots *soluciones pacificas y viables*/pacific-viable solutions to these problems through the development of sustainable urban agriculture and plant-based micro-business. The life stories presented in Chapter Six show the ability of humans to modify their environment adapting their agricultural practices to urban situations. Developing an innovative method to documenting success factors in urban farming was perceived as a viable strategy for research/development participants. This strategy may promote urban agriculture as a way to improve their communities.

⁶ As examples are the two earthquakes that shook El Salvador on January 13 and February 13, 2001 and the current draught that has caused the lost of the harvest in the whole country.

Eighteen articles written between 1987 and 1999 provide information regarding urban agriculture developed during the last two decades in several countries not including El Salvador⁷. According to Smit (1997), urban agriculture has produced, processed, and marketed food and energy for towns, cities and metropolises, using land and water dispersed throughout urban and peri-urban areas in a variety of countries. Nelson (1996) reports that, "... millions of people are now producing food right where they live - on empty lots, on rooftops, and in their own backyards" (p.10). Nelson also states, "... according to the most widely accepted estimate, about 200 million urban dwellers world wide now participate in urban farming, providing 800 million people with at least some of their food" (p. 11). Bohrt (1993) says, "... most beneficiaries of urban agriculture [in several countries of Latin America] are low-income families living in suburban or marginal city areas"⁸. These experiences show the potential value of developing urban agriculture in El Salvador and the potential value of the present research for Salvadoran organizations interested in promoting it.

Smit⁹ (1997) has listed some of the trends in urban agriculture worldwide since 1975, as follows:

- More than 15 million small producers of vegetables, fruit and poultry consume their products and sell part of them locally.
- It is expected that if the trend continues, by the year 2005, more than 25% of the world's food will be produced in urban areas.
- In countries from the South, like Ecuador and Chile, urban agriculture brings not only food security but also creates jobs and produces environmental benefits.

⁷ The researcher did not find literature regarding urban agriculture in El Salvador.

⁸ Articles downloaded from the internet are not paginated.

⁹ Smit was the "president of The Urban Agriculture Network (TUAN) and co-author of Urban agriculture: Food, Jobs, and Sustainable Cities, recently released by TUAN and the UN Development Programme" (Nelson, 1996, p. 15).

- In countries from the North, like USA and Canada, Smit argues that urban agriculture produces products of better quality. The reason given by Smit is that fresh vegetables produced by families, who consume them, do not go through preservation processes.
- Families, he mentions, consume traditional products, rather than consuming hybrids that have lost the original makeup and are decreasing biodiversity, thus, helping conserve the diverse original gene pool.
- Smit's study notes that "The organisational structure of urban agriculture is changing... the most dramatic change is the 'Virtual Corporation' [which] enables small producers and processors to market their products efficiently with the benefit of prompt reliable technical and market information, and access to credit. Virtual corporations are allowing the small grower to enter the market" (n.p.). An example cited by Smit (1997) is the Jerusalem Hydroponics Vegetable Co-operative, which integrates a board of directors with six producers and three marketing experts. All of their producers are self-employed and sell their products on a weekly schedule.

These researchers and others such as Cosgrove (1998), Ellis & Sumberg (1998), Heimlich (1989), Herbert (1999), Heath (1998), Lawrence (1988), Maxwell (1995), Mlozi (1997), and Saunders (1999) recognize urban agriculture as an opportunity to improve social and economic family conditions and sustain healthy functioning ecosystems by maintaining biodiversity and protecting natural resources. Some of the benefits most frequently noted are community building, healthy food consumption, income and employment generation, agriculture development, environmental awareness and sustainability.

Considering the urban agriculture findings from different countries, it is believed that the adaptation of agriculture to urban settings developed by small farmers in El Salvador might contribute to solving the dilemma expressed by Nelson (1996) of "how to feed the growing number of people [in El Salvador] who are far removed from their main sources of food, without unbalancing and collapsing the ecosystems" (p. 10). Thus urban agriculture can address poverty and environmental problems in El Salvador. "Through growing vegetables such as cucumbers, radishes, lettuce, beans and

corn, the nutritional needs of the ... [people] are gradually being addressed [in some countries of Latin America]" (Hochachka, 1999, p. 25). Furthermore, according to Heath (1998), a person in any country, might be able to keep a plant variety alive, keeping it from becoming extinct. The following excerpt shows, however, that more holistic research is needed.

Ningún otro [form of agriculture] es tan diverso en cantidad de especies y variedades, complejo y variado en estructuras y posibles asociaciones y tan complejo en sus funciones como el huerto casero. Esto lo hace a la vez un sistema sumamente interesante pero complicado de entender, que requiere de un enfoque de estudio multidisciplinario e integrado, combinado con una visión de promoción/expansión abierta y tolerante hacia sus características principales (Lok, 1998, p. 3).

[No other (form of agriculture) is so diverse in quantity of species and varieties, complex and diverse in structures and possible associations, and so complex in its functions, as the family garden. This makes it at the same time extremely interesting, but complicated to understand; it requires a multidisciplinary and holistic study, open and tolerant to its principal characteristics] (author's translation).

Economic and environmental factors compelled the nine families of San José Cortez, Mireya II, and El Limón (see Chapter Five) to develop plant-based micro-businesses, looking for better alternatives to grow food and medicinal plants and generate income. It was believed that this research would provides a variety of communities, NGOs and the Salvadoran government with a method and relevant information that might be used to design community development projects based on urban farming and support the poorest of the poor creating healthy human conditions.

Research Goals

Human ecology's mission is the creation and maintenance of "an optimum balance between people and their environments" (Sontag and Bubolz, 1988, p. 125). The present research was designed to provide communities and community developers with a method for assisting

urban farmers. This method will help them to create and sustain community development processes that allow all community members to reach the ecological balance necessary to live healthy lives and to preserve natural resources for future generations. Two elements were considered essential for farmers to reach this objective: Knowledge and approach. For the purpose of this research, it was assumed that a participatory method and the local knowledge are crucial for community development without losing their own identity and culture.

Small farmers developed urban agriculture¹⁰ after settling in urban areas in El Salvador in an effort to produce food and medicinal plants. They use these plants to develop plant-based micro-business generating income and improving their well being. However, according to information collected by Balsam, most were unsuccessful. Those few who succeeded were willing to share their knowledge and experiences for others to achieve the same success. A method to document and to share that knowledge was needed. Furthermore, research was necessary to formally document or analyse those experiences in El Salvador.

The current study was to combine research and development. The researcher considered two elements as essential to the inquiry. The first one was the creation of an appropriate approach that would facilitate the participants' ability to pursue and sustain their own development through networking, capacity building, and empowerment. The second element was the creation/acquisition of new knowledge through research¹¹. The information collected and discussed would then help in two aspects. It would increase resources for community developers working in urban agriculture and it would establish the basis for further scientific research. In addition, this research has two interwoven goals:

¹⁰ For the purpose of this research, urban agriculture is defined by the author as the process of plant cultivation in small lots in the city for own consumption and income generation.

¹¹ "Research is ...a systematic inquiry aimed at the discovery and interpretation of new knowledge" (Gibson and Gibson, 1999, p. 3)

- To present the Ecological Participatory Action Research (EPAR) developed as a research strategy that would also facilitate and encourage appropriate sustainable community development; and,
- To collectively produce new knowledge in a way that facilitates research/development participants gaining maximum benefit from their involvement in the research/development process.

Thesis Content

The thesis introduction, research background, justification, research goals, and thesis content are presented in Chapter One.

An analysis of the Salvadoran national context¹² is presented in Chapter Two. The content of this chapter is critical in two ways. First, it promotes understanding of how the different environments of research/development participants critically affect their self-perception and the ways they take action to meet their needs. And second, it conveys information and knowledge to the research participants so that they are able to design their research and developmental actions.

For this research to be effective within the Salvadoran context, a human ecological theoretical framework was applied to design the research. This is presented in Chapter Three.

The context in El Salvador demonstrates a need for the creation of a new research strategy to simultaneously collect data and start addressing the problems of poverty and environmental deterioration within the research/development participants' communities. In this way, the Ecological Participatory Action Research (EPAR) model was developed as a strategy to both meet academic requirements and benefit those communities. The EPAR model is discussed

¹² Context is used in this research to describe the social, economic, environmental, and agricultural conditions in El Salvador.

in Chapter Four and its appropriateness may be measured against the information presented in Chapter Two.

Chapter Five describes the fieldwork carried out using the EPAR model. It includes a description of research/development participants and their communities and the sample as well as the EPAR phases and the data recording and analysis techniques.

The data collected and the actions inspired by using the Ecological Participatory Action Research (EPAR) are documented in Chapter Six. It includes three case studies (life stories) and a description of the knowledge, philosophies and beliefs used in urban farming by the research/development participants. The stories of three female research/development participants with a strong background in agriculture, one from each community investigated, show the evolution of the indigenous knowledge and the factors that historically have influenced the changes, which are related to the context presented in Chapter Two. Their stories also show the strong participation of women in their family well being and may influence women's current practical experiences and provide input for further agricultural indigenous knowledge research.

Chapter Seven documents the results obtained in this research and the potential of the EPAR model when combined with indigenous knowledge to start actions that would entail more appropriate community development endeavours.

Chapter Eight presents conclusions and recommendations for future research and community development endeavours as well as recommendations for policy change.

Chapter Two: The National Context

Introduction

In the past, El Salvador had great biological diversity due to its geographical location, its tropical weather, volcanic soil, and a variety of ecosystems within its boundaries. The economy was based mostly on the export of agricultural products. Until the beginning of the 1970s, agriculture comprised approximately 66% of the gross national product (GNP). However, this situation has changed gradually. Between 1990 and 1998, according to “Situación socio-económica” (2000), agriculture dropped from approximately 22% of the GNP to just 12.8% (p. 6) affecting the socio-economic conditions of the majority of the Salvadoran population.

At present, as mentioned in Chapter One, poverty and depletion of natural resources are two of the biggest problems in El Salvador. Most people make their living by buying and selling goods and/or cultivating traditional subsistence, ornamental, and medicinal crops to either feed their families or sell the products, but only a few succeed (Balsam, personal communication, April 24, 2000). Among the successful farmers are the micro-entrepreneurs/community leaders that participated in this research. To analyze holistically actions and knowledge that research participants apply to succeed in their farming activities, an understanding of the context is needed. This Chapter is an attempt to facilitate that understanding.

Historical Background of Salvadoran Population

For thousands of years, the Incas and Mayas were the most developed indigenous cultures in Central and South America. There has been an on-going disagreement among researchers about whether the Salvadoran population descends from the Maya or the Aztec culture. The Mayan corn culture, Aztec social organization model, and Mayan and Aztec economic models have all been found in the Pipiles culture, which was predominant in El Salvador at the time of conquer (Equipo Maíz, 1995).

According to Equipo Maiz (1995), the native name for El Salvador was Cuscatlán, which means Land of Happiness. There were two tribes/peoples before the conquer: Pipil and Lenca. Over time, the Pipil culture absorbed the Lenca culture. The Pipiles divided the territory in *cacicazgos* (or regions), which internally, were divided into *calpullis*, or communities. Each *calpulli* shared land and food and paid tribute to priests and nobles. Each family was assigned a plot of land to cultivate. The Pipiles' economy, like that of the Mayas and Aztecs, was mostly based on the cultivation of corn and other vegetables. There were both common and private properties. They were also advanced in scientific matters such as writing, mathematics, the calendar, and architecture. However, after 15 years of war, in 1539, the Spanish conquerors subjugated the Pipiles, destroying their culture, religion, and social and economic organisation. As a result of intermarriage, a mixed race called *mestizos*/mixed emerged, (Equipo Maíz, 1995).

Today nearly 90 percent of the population is *mestizo*, a mixture of European and Native American descents. People of purely Native American descent represent about five to ten percent of the population, while people of European descent represent only about 1 percent (Encarta, 1998). The researcher and research/development participants share the mixture of Native American and European background.

The Social Economic Context and Agriculture

Green Revolution

According to Khor (1996), the Green Revolution is

A package program that makes it possible to grow more than one crop per year through the introduction of high-yielding seed varieties, high doses of chemical fertilisers and pesticides, agricultural machinery, and irrigation. [It implies a] new plantation system [where] much of the land formerly planted with traditional food crops has been converted into cash-crop production for export (p. 50).

This is the case in El Salvador. The green revolution was used to cultivate a few cash crops: coffee, cotton and sugar cane. It has not been effective in meeting the nutritional and economic needs of the majority of Salvadorans and has resulted in a loss of plant biodiversity and soil fertility. An example of this trend is that "[in] El Salvador... 81 percent of the arable land is used to grow coffee and is owned by three percent of the population" (Freund and McGuire, 1999 citing Kotsch, 1985, p. 44). The majority of farmers have only access to deteriorated land, and there is also a growing deterioration of the natural resources ("Marco general," unpublished, p. 4 & 20). Not only cash crops are culprits for the environmental damage in El Salvador, lack of proper treatment of served waters and deforestation (wood is still one of the main sources of energy in El Salvador) are also other main factors contributing to the environmental degradation.

The Green Revolution left hundreds of thousands of peasants without land in El Salvador. While in 1961 only 30,541 families were landless, by 1971, called the golden age of cotton, 112,108 families were without land to cultivate for their own food. The official number of families without land was 220,000 in 1980 although non-governmental organisations reported that there were approximately 364,000 peasants without land ("Situación de la tenencia", 1999). This is more than a tenfold increase in the number of peasants without land in 20 years.

To produce their food, most peasants must rent land. They procure loans from the credit unions in order to pay the rent and to buy the chemical fertilisers, herbicides, and pesticides necessary to produce on the badly deteriorated land. Working with rural communities in the 1970s, the researcher witnessed that most families only produced enough to pay their loan and to have corn and beans for about three to four months. Family members had to work on salary for large cash crop corporations, which were backed by the corrupt government and its military. These corporations usually paid very low wages and often even less than the workers were due.

Rural unemployment, underemployment and lack of land left the majority of peasants in extreme poverty, forcing them to heavily exploit the rented land in order to produce only a

fraction of their nutritional needs. Peasants became so desperate that some of them migrated to urban areas or other countries, especially the United States. According to Montes and Vargas (1986), the high unemployment level was the main cause for rural people to migrate to urban areas or to immigrate to other countries, especially to Central American, Mexico and the United States.

Civil War

The war in El Salvador lasted from 1980 to 1992; however, violence against peasants started early in the 1970s. A story, reconstructed in 1977 by peasants in a small town in San Salvador¹³ exemplifies the kind of conditions faced by peasant that led to the civil war¹⁴. By the middle of the 1970s, there were approximately three hundred peasants working in a sugar cane farm in a town¹⁵ close to the capital city. They were supposed to be paid every two weeks, but were often told that the money had not come and that they had to wait for another week to receive their full payment. However, by the following week they usually received the pay for only two weeks of work. Most of these peasants did not know how to read and write, but they knew that something was wrong and that they were not receiving their full payment.

At this time, members of the Catholic Church came to help peasants meet their basic needs. Peasants were taught how to read and write, and they got organized to support each other. They learned that they had common problems and common needs. After a couple of months of meetings, the payment on their farm was delayed again. This time, however, peasants responded. In just half an hour all of them agreed to stay on the farm until they received their full payment.

¹³ The researcher was a member of the pastoral team of this parish from 1977 to 1980 during the worst violence against peasants, preceding the war.

¹⁴ This story was documented in 1977 by the researcher to understand the history of the community she was trying to serve. Twenty years later, the researcher met two ex-members of the same community in another town while she was working as a consultant. These people corroborated the story.

¹⁵ The names of people, towns, parish, and cities named when talking about the war will not be provided due to security reasons.

The farm representative was surprised and thought the priests working in that area from the near parish had advised them to take this action. The representative called one of the priests, who listened to both sides and said: “I have not advised them, but they are right. You must pay them their full salary and I will stay here with them until you do that”.

The farm representative called the *Ministerio de Trabajo* (Ministry of Labour) and a delegate came to mediate. Once he listened to both sides, he ruled that the farm representative had to pay. Similar events happened in different parts of the country. The first person that told this story added: “On that day, we knew that if we were organized and unified, our rights would be respected, we had the church through which to express our faith. But for cases like this, we needed a political organisation. So, we joined a political organisation and developed it”.

Unfortunately, this story does not have a happy ending. The problem was that larger corporations lost some battles but started a war by using their power and their money to get the government and its military to back them. Moreover, the struggle of the poorest for survival was interpreted as a communist movement and the United States provided the Salvadoran government with billions of dollars to end it (Towell, 1997). At the beginning, the different community political organisations tried to defend themselves and create public awareness about their situation, but they were accused of being communists. Catholic Church priests were killed or, if they were foreign, deported.

At that time, community leaders were killed just for having a Latin American Bible, or any liberation theology literature. The author is unable to forget a day when a woman came and while crying told her: “Last night the military came to my community and killed a man from each family. My husband was not at home, so they killed my 17 year-old son.” This situation made the poorest of El Salvador look for support to take up arms against the government. By the end of the 1970s, a civil war, later supported by the United States, began.

It was over El Salvador, an obscure, overpopulated land of six million, that the Reagan administration fought some of its most savage battles with the Democratic Congress; and it was to

El Salvador that the administration and Congress eventually sent billions in military aid, financing the bulk of a civil war in which seventy-five thousand Salvadoran lives were lost. (Towell, 1997, p. 11).

Poverty, injustice, and the struggle for survival motivated peasants to participate in the civil war. One day, in the 1970s, a pregnant woman told the researcher: "*es mejor morir preleando al opresor que morir de hambre*" ("it is better to die fighting our oppressors than to die of hunger") (author's translation). She was killed a few months later in her own home.

Each morning, as the skies lightened over El Salvador's cities, people would rise to find corpses littering their streets: sometimes the bodies were headless, or faceless, their features obliterated with battery acid or a shotgun blast; sometimes limbs were missing, or hands or feet chopped off, or eyes gouged out; women's genitals were torn and bloody, bespeaking repeated rape; men's were often cut off and stuffed into their mouths (Towell, 1997, p. 12).

The war was mainly waged in rural areas, increasing the rates of rural unemployment, underemployment, poverty and deterioration of the natural environment. For many decades, both urban migration and emigration to other countries (primarily to the United States) have been part of El Salvador's reality. However, the 1980s armed conflict aggravated the situation, causing 50% of the rural population to flee to urban settings within the country or to other countries (Aguilar, et al. unpublished). The other half had no choice but to stay and suffer the consequences of the war.

The land was entirely deserted, deliberately devastated and emptied of civilian population in 1980-1981 by the Salvadoran army, which was intent on destroying the guerrillas of the [Frente Farabundo Marti para la Liberacion Nacional] FMLN. The US-trained forces had used a tactic known as 'draining the sea', to deny the guerrillas (the 'fish') support by the simple expedient of eliminating the civilian population in one of their most important strongholds (Macdonald and Gatehouse, 1995, p. 1).

During the guerrilla offensive that was launched in November 1989 in San Salvador, one of the government's first reactions was to kill six Jesuit priests who, like bishop Romero, always called for a negotiated solution. These priests were the president, deans, and department chairs of the Central American University "José Simeón Cañas" (UCA). Many others were killed on the same night that those priests were killed. The international criticism suffered by the government and the offensive itself made the parties involved realise that a negotiated solution was needed.

In January 1992, after more than ten years of civil war and under international pressure to find a negotiated solution, the peace accords were signed. According to research participants and The Balsam Association (personal communication, April 24, 2000), the war left rural areas desolated, agricultural businesses in bankruptcy, and traditional agricultural practices almost ended. Many agriculturists now live in urban areas within El Salvador or in different countries, mostly the United States.

Economic Globalization

According to Arriola and Aguilar (1995), globalization is the creation of an international market in which financial, commercial, and productive capital circulate freely. Economic globalization then has two objectives: Free mobilization of capital and the creation of one market. In this way, the driving forces behind globalization are multinationals and banks. Salvadoran entrepreneurs were strongly interested in participating in this process.

According to research participants, it is common knowledge in El Salvador that during the war, the economy of El Salvador almost collapsed as big businesses and the government, with the billions of dollars of support from the United States, concentrated on trying to end what they called the "communist rebellion". During that time, a new economic elite emerged and the base of the national economy switched from rural agriculture to urban finance. At the beginning

of the 1980s, a new political party (Alianza Republicana Nacionalista, ARENA) was founded by members of the Salvadoran extreme right, and Roberto Dahwison among them, the person suspected of ordering the murder of Bishop Oscar Arnulfo Romero¹⁶. ARENA won the Legislative Assembly elections in 1985 and the presidential elections in 1989 and started to implement a neo-liberal economic model.

From 1989 to 1991, the government tried to re-activate the economy, bringing the country into the globalization process without regard for the limitations imposed by the war on the country and the social consequences of the war. Their goal was to implement policies of stabilisation and structural adjustment following market logic and guaranteeing respect for private property. Government policy, then, was centred on solving the public, commercial and inflation deficit, prioritising privatization while neglecting social, gender, and environmental unbalance and sustainability (Goitia, 1998). However, the government strategy was unsuccessful. The Gross National Product (GNP), from 1989 to 1991, increased just 2.1% and the agricultural sector that had grown by 7.4% in 1990, grew by only 0.3% in 1991 (Goitia, 1998). Finally, the economic situation discussed above, the abilities and skills demonstrated by the guerrilla to continue fighting as long as it was needed to win the war, and the international pressure on the Salvadoran government to respect human rights, forced the government to negotiate a solution with the guerrilla. The peace accords were signed in January 1992, increasing ARENA's party appearance as the one that saved the country from war.

Between 1992 and 1994, after the peace accords were signed, the ARENA government received considerable international support to re-build the country. The average GNP growth rate was 6.5% in those years. The neo-liberal economic model continued to be followed, focusing on privatization. The taxation system was adapted to meet the needs of the financial sector and large

¹⁶ Bishop Romero was killed during a mass in March, 1980 for supporting the poor and calling for the military to end the violence. He called himself "the voice of those without a voice." He is in the process of being canonized.

corporations. Import taxes were eliminated or reduced (see Table 2.1). The coffee tax was eliminated, and the *Impuesto al Valor Agregado (IVA)* (added value tax), a 10% tax similar to Canada's general sales tax, was created.

Table 2.1 Importation Taxes

Products	Tax rate in %
Materias primas (raw materials)	0
Productos intermedios (middle goods)	5-10
Productos finales (final products)	15

From Balance económico, 1999.

These policies resulted in three major socio-economic problems: a decrease in the production rate of the national industry, a deepening crisis in the agricultural sector, and an increase in unemployment, underemployment and poverty. National producers were unable to compete with imported products because outdated technology did not allow them to produce at lower cost than imported goods. Rural and urban industries, as well as ex-government offices (the ones that were privatized) laid off many employees. In rural areas, the situation was also bad as sugar cane and coffee had less significance in the international trade and prices dropped.

One intended solution to those problems had been the agrarian reform that started in 1979 and continued until 1992, when the peace accords were signed. Approximately two hundred and seventy thousand farmers became owners of small (one to five hectares) plots of land ("Marco general", unpublished). However, there are approximately 500,000 small farmers ("¿Hacia la reactivación", 2000), including some small landowners, who migrated to urban areas, as they were unable to continue farming. Consequently, the role of agriculture in the Gross Domestic Product decreased. In 1988, coffee represented 6% of the GDP, 58.8% of exports, and 21.5% of tax income while in 1998 it represented only 3% of the GDP, 18% of exports, and no tax income ("Reactivación del Sector", 1999 and "Balance económico", 1999.). Agriculture, in general, grew 8% in 1992, but its importance dropped to -1.4% in 1993 and -2.4% in 1994. The

commercial and finance sectors benefited more from government policies since they had a growth rate of 8.5%, 6.5%, and 8.6%, and 16%, 10.7% and 20.2% respectively, during each of the three years in this period (see Table 2.2).

Table 2.2 Evolution of National Accounts: Growth Rates at 1990 Constant Prices

	1992	1993	1994	1995	1996	1997	1998	1999 _{1/}
Gross Domestic Product	7.5	7.4	6.1	6.4	1.7	4.2	3.5	3.4
Agriculture	8.0	-1.4	-2.4	4.5	1.3	0.4	-0.7	6.9
Trade, Restaurants and Hotels		6.5	8.6	9.9	0.4	2.9	3.8	1.7
Banks, insurance companies and other financial institutions	21.4	10.7	20.2	16.4	2.7	12.6	8.9	15.4
Consumer Price Index		12.1	8.9	11.4	7.4	1.9	4.2	-1.0
_{1/} Preliminary figures								

Data from the Central Reserve Bank of El Salvador (2000)

1995-1997 is considered a decelerated economic period by Salvadoran analysts. The emphasis was on privatization. The government wanted to convert El Salvador into a big free trade zone (*maquilas*) and an International Financial Centre. However, the Salvadoran economic model did not take into consideration the need to have consumer-spending power in order for the economy to develop. The free trade zone and financial business were good for economic growth, but not for development. Both, the uncontrolled open doors policy for external business and the lack of context adaptation of industrial and agricultural production made it difficult for national products to compete with external business. As a consequence, unemployment and underemployment increased to rates close to 60% of the economically active population.

These phenomena added to the deterioration of the real income and decreased demand for goods. Imported products were cheaper than national products, but still too expensive for most consumers who already also had to pay more for utilities, which were in private hands, and more taxes. The IVA was increased from 10% to 13%, (Goitia, 1998). In this way, the GDP,

which in 1995 grew by 6.4%, sagged to 1.7% in 1996 and 4.2% in 1997. But the financial sector, which also decreased in 1996, maintained an annual increasing growth rate in the following years (see Table 2.2) and started lobbying for using the US dollar as the national currency (Goitia, 1998).

In the last decade, import taxes were reduced on some agricultural products from 270% to 20%, resulting in an expansion of imports at the cost of exports (see Table 2.3). Currently, the country is still considered to be in a period of economic deceleration. The economy has not collapsed thanks to the remissions from emigrant families (see Table 2.3).

Table No. 2.3 Evolution of National Accounts in Millions of US\$¹⁷

Concept	1993	1994	1995	1996	1997	1998	1999*
Total exports	1,032	1,249	1,652	1,787	2,429	2,460	2,510
Total imports	2,145	2,574	3,329	3,222	3,748	4,032	4,094
Balance	-1113	-1325	-1677	-1,435	-1,319	-1572	-1584
Families remissions	US\$ 1,044	1,285	1,390	1,254	1,364	1,500	1,557

*Preliminary figures

Data from the Central Reserve Bank of El Salvador (2000)

Agriculture has not been a priority in the national neo-liberal economic model. Small farmers and large agricultural corporations have been hurt by the high cost of borrowing, high prices of agricultural inputs, and unfair competition with other sectors of the economy, specially finance. In this way, small farmers have not had many income generating opportunities in rural areas as they have not been able to produce on their small plot of land (assuming that they have land at all) all the basic food needed and to find a paying job with large corporations. Each day fewer and fewer people want to farm and in the majority of cases they have chosen to sell their small plot of land and migrate to urban areas or emigrate to the United States (Aguilar, et. al, unpublished). Agriculture's representation in the GDP decreased yearly until 1996. Since then, it

has stabilized are around an average of 12.7 per cent (see Table 2.4). Currently, the ARENA party is still in power although their popular support has waned. Thus, the government is becoming more interested in recovering the trust of the farmers.

Table 2.4 Representation of Agriculture in the GNP

Year	Agriculture in the GDP
1960	34.7 %
1994	13.8
1995	13.6
1996	12.5
1997	13.0
1998*	12.5
1999*	12.9
* Preliminary figures	

From Banco Central de Reserva (1999) and (2000)

On May 4, 2000, the president of El Salvador announced a new national agricultural policy, “Política Agropecuaria y Gestión Agraria Nacional 1999-2004”. Among other measures, the government plans to build 1000 km of road and increase taxes on foreign products, including agricultural products.

As explained before, the replacement of national products by imported products, and the increased external commercial deficit has been counterbalanced by family remissions. The new tax policy would result in increased opportunities for producers to compete with imported products. According to “La política agropecuaria” (2000), taxes on some products such as meat will increase from 15% to 40%. However, these measures do not seem to affect all farmers in the same way, nor current conditions of small farming. On one hand, the president of El Salvador has offered subsidies to coffee producers, who depend on international prices making it difficult for them to substantially increase agricultural exports. Shade grown coffee, produced in El Salvador, is good for the natural environment, but not for poverty alleviation. In 1990, coffee

¹⁷ Colón was the only local currency until Dec. 31, 2000, usually US\$ 1 = 8.7 colones. Since January 2001 the local currency is US\$ though people still are able to use colones. Exchange rate is 1US\$= ¢8.75.

producers used only 29% of their reserve to pay wages while 65% went to their own profit to “La política agropecuaria” (2000). The new taxation system transfers income from the urban to the rural sectors, especially to the coffee producers thereby increasing economic problems in urban areas but not benefiting small rural farmers.

It is not clear what kind of benefits small farmers will directly receive from this national policy. At the time that this research was carried out, most small farmers had not had opportunities to develop their technical production capacities to meet the national demand for agricultural products. As a consequence, both urban and rural consumers will have to pay more for basic food products such as corn, rice, sorghum, milk, cheese, fruits, and vegetables and the poorest of the poor will be unable to meet their basic needs (“La política agropecuaria”, 2000).

Poverty, Unemployment, Underemployment, and Urban Migration

According to the 1992 IPC¹⁸ magazine (Consumer price index, Dec. 1992) the cost of living for a family of 4-5 members was ¢¹⁹1313.38 (US\$150.96) per month just for food and ¢3,160.39 (US\$363.26) for rent, clothing, utilities and miscellaneous. According to the same source, in 1997 a urban family of 4-5 members needed ¢1249 (US\$ 143.56) per month just for food and ¢2,498 (US\$ 287.13) for food and other basic needs. In other words, in 1997 families needed less money to live than in 1992. This seems to be contradictory as inflation in 1997 was 1.9% (see table 2.2). People would need more money in successive years of inflation to meet their needs (“Situación de la pobreza”, 1999). However, even by the more conservative reckoning, it is clear that an urban family of 4-5 members needs more than ¢2000 (US\$230) per month to meet their needs. According to “Encuestas de Hogares” (1997), only 52% of families in El Salvador made more than ¢2,000 (US\$230) per month.

¹⁸ La División de Información Social/social information division (DIS) of the Dirección General de Estadísticas y Censos/General Direction for Census and statistics (DIGESTYC)

¹⁹ ¢ is the symbol for colones, the Salvadoran currency.

In rural areas the situation is similar. According to IPC, in 1997, a rural family of 4-5 needed ¢973 (US\$107.70) for just food and ¢1947 (US\$223.79) for rent, clothing, utilities and miscellaneous. However, due to unemployment and underemployment, most people did not have the financial capacity to buy what they needed. Trying to increase the capacity of people to consume in rural areas, the government slightly increased workers' minimum wage. From December 1991 to December 1998, the minimum wage was ¢28.18 (US\$ 3.24) per day. It was decreased in January 1999 to ¢27.04 (US\$3.11). In August 1999 the daily wage was increased to ¢27.37 (US\$3.15) according to "Balance económico", 1999). This measure is approximately ¢810²⁰ (US\$94) per month, which is still insufficient for rural people to meet their basic needs. Hurricane Mitch aggravated the problem in 1999, resulting in approximately ¢1,159 million (US\$133.22 million) in losses, mostly in agriculture, and expanding the need for importing food, ("Balance económico", 1998).

According to "Encuesta de hogares" (1996), 50% of El Salvador's population lives in poverty with 30% in extreme poverty, a situation that negatively affects the domestic market, resulting in deflation in 1999 (see Table 2.2). The situation was worse for people who are not employed or are underemployed. According to Goitia (unpublished), the unemployment and underemployment level in El Salvador was 60% in 1998. These people not only have to look for different ways to make their living (usually as micro-entrepreneurs), but also to pay the consumer tax. Consumer tax represented 65% of the total tax revenue paid by consumers in 1999 and there are no exceptions in the taxation system in El Salvador ("Deficit fiscal, reformas", 2000).

With the new import tax, the stagnation within the agricultural system, and the recent (January 1, 2001) shift to US\$ currency, economic analysers, according to "Deficit fiscal", expect that the new government agricultural policy will spark inflation. Inflation will heavily

²⁰ In El Salvador, for a 44 hours week of work you are paid the seventh day.

affect food products, further jeopardising the already deteriorated nutritional status of the majority of Salvadorans and also the deteriorated natural resources. Poor people will pressure them to produce food ("Estrategia Nacional", 2000). According to the information provided above, the low demand for goods in El Salvador has caused an economic recession, but the government is implementing measures to combat inflation. It is clear that these measures are only an attempt to benefit large corporations, especially in the financial and commercial sectors Goitia (u.p.).

Two interconnected phenomena resulted in the situation described above: poverty and war. Poverty resulted in urban migration and war. The war further increased poverty and urban migration. The war ended in 1992, but most migrants did not go back to rural areas. According to the Ministerio de Medio Ambiente y Recursos Naturales/Ministry of Environment and Natural Resources (2000), in 1971 the urban population in El Salvador represented 40% of the total while in 1992 it was 51%. Rural poverty has continued and so has urban migration.

Migrating to the urban areas did not solve the problems. People have not been able to find jobs and most of the families make their living as self-employees and micro-entrepreneurs. In addition, the number of families living in extreme poverty has increased. The cities have expanded, destroying their few green areas. Furthermore, the country faces deterioration of its natural resources and increased dependence on food imports, especially vegetables, of which 70% are imported from countries such as Honduras and Guatemala. This situation threatens the nutritional security of the country, especially after the recently approved law that applies sales tax to agricultural products (Aguilar, et al. unpublished) and the use of US dollar as the national local currency in El Salvador. "A 1994 study revealed that [in El Salvador] 85 percent of children in 78 communities received less than the daily nutritional requirements for the prevention of anaemia, while 99 percent of children did not receive the minimum recommended daily dosage of vitamin A, resulting in debilitated vision. Malnutrition has a considerable impact on personal health and the capacity to effect

positive change, and results in people taking drastic measures to obtain food, often at the expense of forests and soils” (Hochachka, 1999, p. 25).

Deterioration of the Natural Environment

The accelerated environmental degradation of El Salvador in the last three decades has led to a loss of over 97% of the country’s forest land. In rural areas, much of the water and soil has been damaged by the overuse of agrochemicals and by contamination from liquid wastes from households and industries. In urban areas with high population densities, hundreds of thousands of trees are destroyed daily to build malls, highways, and houses. At present, El Salvador has less biodiversity than any other Central American country (Cavada, 2000).

The forest destruction has led to the reduction of water sources, contamination of air, erosion of soil (diminishing soil fertility), and destruction of a variety of animal and plant species. According to Cavada (2000), 75% of Salvadoran soil suffers from erosion. However, it is still possible to restore biological diversity, as it is still richer than in developed countries. The problem, Cavada emphasises, is that there is no governmental program to preserve biological diversity.

According to research participants, previous attempts to protect and recover ecological resources in El Salvador have been in vain. In large part, the reason has been that the projects have focused on rural areas while neglecting the fact that the ever-expanding urban areas destroy environmental resources needed to protect biodiversity. As a result many organisms have lost their ecological niches, and are now on the brink of extinction. Most of the land is deteriorated.

According to “Estrategia nacional” (2000), 66% of agricultural land is class V-VIII, which is severely or very severely damaged, limiting agricultural development. It is recommended only for permanent crops or protected areas (forest), as it is not good for cereals or vegetable production. Only 34% of agricultural land is class I-IV, which can be used for

intensive agriculture, but still requires a variety of protection practices depending on the kind of crops grown and soil conditions (see Table 2.5).

How the agricultural land is distributed is a clear indicator of current and potential social economic and environmental problems. The majority of cash crops for export are produced in the south of El Salvador and large corporations own the land. In the south of El Salvador there is less agricultural land (49% of agricultural land in the country), but this land is better than in the North. It comprises 74% of the good agricultural land. Population density is high in the area and there is less *infraestructura*²¹/infrastructure but heavy use of agrochemicals. These three factors may increase deterioration of land and living conditions. Almost five million people pressure natural resources for survival and so do large corporations to increase their production.

Table 2. 5: Agricultural Land Classification and Distribution

Kind of soil	North		South		Total	
I - IV Km ²	1783	17%	5,118	51%	6,901	34%
of good soil	26%		74%		100%	
V - VI Km ²	8,706	83%	4,882	49%	13,588	66%
of bad soil	64%		36%		100%	
Totals	10,489	100%	10,000	100%	20,489	100%
	51%		49%		100%	
Inhabitants	1 million		4.8 million		5.8 million	
Infrastructure	>		<			
Characteristics	<ul style="list-style-type: none"> • More rural peasants • Cereal producers • Lower poverty level • More affected areas by the war • Municipalities in reconstruction. 		<ul style="list-style-type: none"> • Heavy chemical use in agriculture. • High toxicity. • Production of cash crop for exportation • High population density in AMSS* • Urbanisation 			

* AMSS=Area Metropolitana de San Salvador/ Metropolitan area of San Salvador, which includes the following municipalities: Mejicanos, Ciudad Delgado, Soyapango, Cuscatancingo, Ilopango, San Marcos, Antiguo Cuscatlán, Santa Tecla, Ayutuxtepeque y San Salvador.

Data from "Estrategia nacional" (2000),

²¹ Pave rods, machinery, equipment, etc.

The north of El Salvador has only a million inhabitants and 51% of the agricultural land; however, only 25 % is good for food production. It is expected that people will also pressure these natural resources for food production. How can rural farmers meet national food demand in this land situation without continuing to destroy their natural resources? Probably they will have difficulty producing even their own food. Thus urban communities in the whole country will not be able to depend on rural food production and will need to find ways to produce their own food.

Another pressure on the natural environment, according to Cavada (2000) is population growth and urbanisation. The 1992 census showed that the population grew by 42% in El Salvador in the last 20 years and that the majority is concentrated in urban areas (see Table No. 2.6). The disorderly expansion of urban areas has led to a variety of social, economic, and environmental problems: Houses are set in high-risk geographical areas; water is scarce and contaminated by industrial liquid waste and improper treatment of sewer water; and garbage is accumulated close to residential areas contaminating the human environment (Cavada, 2000). According to Cavada, San Salvador is the most contaminated city in Central America and 60% of all garbage produced nationally is produced in the metropolitan area of San Salvador.

In this context, two major problems affect women and men in urban and rural areas: lack of environmentally friendly and healthy food production, and income generation. Most agricultural activities are developed on sloping land vulnerable to soil erosion and close to highly contaminated rivers, which usually are not considered appropriate for agriculture in other countries. A study made by the National University and the Alberto Masferrer University in San Salvador found that the bacterial level in fruits and vegetables sold in open markets was 390 to 4,200 and the bacteria level in those sold in grocery stores was 330 to 500 times higher than levels tolerated by the American Microbiology Society (Navarro, 1990). Soil erosion has led agriculturists to increase the amount of agrochemicals used year after year, hoping to increase

land productivity. Instead they are getting increasingly deteriorated land and unhealthy food for their rural and urban communities Navarro (Cavada, et. al, 2000).

Table 2.6 Salvadoran Populations in 1992

GENDER	URBAN	RURAL	TOTAL	AMSS*	%	Other regions	%
Men	1,473,393	1,275,353	2,748,746	667,575	24%	2,081,171	76%
Women	1,694,100	1,344,920	3,039,020	780,665	26%	2,258,355	74%
Totals	3,167,493	2,620,273	5,787,766	1,448,240	25%	4,339,526	75%

*Area Metropolitana de San Salvador/Metropolitan area of San Salvador.

Source: The Balsam Association (unpublished)

Discussion of the Context in relation to this Study

Three factors have contributed to the decline of agriculture in El Salvador: The green revolution, the civil war, and economic globalization. These three factors have led to unemployment, underemployment, poverty, urban migration, and the deterioration of the natural environment. These, in turn, have resulted in malnutrition of people and decreased opportunities for them to meet their basic needs. Natural resources have been commonly perceived as an infinite source of wealth, without the awareness that the destruction of them has a negative impact on the quality of human life. The Salvadoran economic system as a whole has led to different social, economic, and environmental problems for which new solutions have to be found.

To many Salvadoran economists, the challenge is to transform the agricultural sector so it can establish and keep sustainable productive strategies that simultaneously lead to an increase in the income of rural people (“Los servicios ambientales”, 1999). Three important factors need to be considered for any potential solution to the problems mentioned above. These factors are as follows:

- The current economic model of the country does not address the basic needs of the poor. According to “Estrategia nacional”, (2000), the central objective of large corporations and the government is economic development, and they expected their policies would facilitate

the well being of people. However, their policies have proven to only worsen the quality of life of peasants, hence the country is challenged to look for new development strategies.

- The high population density (257 people per Km², according to Panayotou, et. al., 1997).
- The insufficient and deteriorated land. If land were to be re-distributed, it would still not be enough for all small farmers and their descendants.

A solution must not only promote growth of the country's economy, but it must increase the spending capacity of the entire population as well as the country's capacity to produce food and goods, thus limiting the dependence on imports and increasing the national market for domestic products. Only in this way can the country's industries develop, and can the country hope to be competitive and increase the quality of life. Hence, a national plan must include effective help for small farmers, and promote food production by the peasant population. Programs need to be implemented that facilitate small-scale farming and provide access to domestic markets with a competitive status.

The context presented in this Chapter has informed the research presented in this thesis. The difficulties facing the country demanded the creation of a research strategy that would simultaneously benefit the research/development participants. The Ecological Participatory Action (EPAR) model is that strategy and it is a tool for research/development participants to search for new knowledge and approaches to develop their communities. Their process started during the fieldwork for this research.

Chapter Three: Theory

Introduction

This Chapter presents the metadisciplinary²² human ecological framework used to design this research. The framework includes paradigms of post-positivism, constructivism, critical reality, and feminist epistemology. It also combines concepts and assumptions that are fundamental to human ecology and feminist family theory with indigenous knowledge, community development, biodiversity, biological diversity and micro-business concepts, among others (See Figure 3.1). The framework assisted the researcher in choosing and delimiting the methods and techniques included in the Ecological Participatory Action Research (EPAR) model (see Chapter Four) as a viable strategy for creating innovative community development initiatives, allowing all community members to reach the ecological balance necessary to live healthy lives and preserve natural resources. The framework also helped me choose the themes and environments to be investigated, and as well as determine the interconnections among the concepts, assumptions, themes, environments, and research findings. The complex context of El Salvador demanded this kind of framework.

The theory helped me not only to frame the research process and analyze holistically the results in the form of actions taken, data collected, and method used, but also to get a holistic understanding of research/development practices in relation to the well being of individuals and the development of communities. "Knowledge production [is] a communal, intersubjective, dialogic examination of observation of facts" (Nielsen, 1990, p.14). The following is a description of the components of this theoretical framework, and a discussion of the constructed human ecology paradigm used to design the research.

²² Metadisciplinary is a holistic concept introduced by Sontag & Bubloz (1988) and then used by Strauss (1990). This concept not only refers to the integration and interrelation of basic concepts and principles from other disciplines but also to the integration of old specialized scientific disciplines with new discipline. In this research, it also combines personal subjectivism, such as common sense, feelings, and emotions.



Figure 3.1: Human Ecological Framework

In this figure, post-positivism, constructivism, critical reality and feminist epistemology are perceived as general theories thus part of the macro-environment that influences the other environments. Human ecology and feminist family concepts and assumptions and IK and community development concepts are perceived as more specific theory thus part of the meso-environment influencing the microenvironments. And the concepts of biodiversity, biological diversity, micro-business tangible concepts familiar to research participants and as such are considered part of the micro-environment directly informing the actions of research/development participants.

Post-positivism, Constructivism, Critical Reality, and Feminist Epistemology

This human ecological theoretical framework took from post-positivism the idea that human limitations interfere in scientific inquiry about reality (Palys, 1992). From constructivism, the ideas that human values influence scientific inquiry and that there exists a human constructed reality (Guba, 1990) were accepted. Critical realism and feminism point out the need to use a methodology for inquiry that does not separate the knower from the reality to be known. This need together with their assertion that objective knowledge is impossible and that several realities exist, were also accepted (Nielsen, 1990). Even though the theoretical framework includes elements of different paradigms, the researcher believes, as did Kuhn, "that data do not necessarily speak for themselves and that theory depends at least partly on one's social location, social identity, and research purposes" (Nielsen, 1990, p.15). In this way, researcher paradigm, common sense, feelings, and emotions were also considered when designing this research.

From these theories, the researcher built her philosophical view. The researcher assumed that there is a reality (God) and that there are natural laws that regulate the cosmos and they must be known in order to reach a wider ecological balance. However, human limitations have interfered with the scientific inquiry and developmental actions, causing ecological disasters such as those seen in El Salvador and explained in detail in Chapter Two. The researcher also assumed that there are several realities and that humans use their values to construct the realities they want to live in. In turn, this influences scientific inquiry and actions for development. Furthermore, the researcher believes that it is difficult to have objective knowledge, and so the knower and the reality are intrinsically linked within a research/developmental framework. These philosophical views affected the research process as a whole.

Human Ecology and Feminist Family Concepts and Assumptions

The Human Ecological family theory was the backbone of the theoretical approach. It entails and justifies the creation of a metadisciplinary and unique framework for developing a method addressing the complex interaction between urban farmers and their micro, meso, and macro environments when producing food and medicinal plants (see Figure 3.1). Feminist concepts and assumptions are central as they help to acknowledge women as agents of change in the farming activities.

Family ecology and feminist family theories differ but complement each other. When, combined, they generate an understanding of the EPAR model as a tool to document the knowledge used by research/development participants in urban farming. Human ecology theory “has attempted to be gender neutral” (Bubolz and Sontag, 1993, p. 428), but feminists emphasise gender differences. However, both are interested in issues of power, inequality, and discrimination and they both aim for social change that would benefit all human beings. From the human ecological perspective, men and women can generate information for the betterment of all humankind. Feminist theory, however, assumes that “males experience the world differently in the everyday world of parenting, friendship, love, sexuality, morality, intellect, conflict or challenge than do females” (Rothe, unpublished, p. 80). The feminist perspective helps to emphasise the role of women within the research/development process. As Polk (1995) claims, differences “based upon gender... ethnic or religious orientation” (p. 25) need to be taken into consideration.

Human Ecology

Two concepts from human ecology theory, “human ecosystem” (Bubolz and Sontag, 1993, p. 431) and “adaptation” (p. 433); and two assumptions, “...all parts of the environment are interrelated and influence each other...” (p. 426), and “...families, regardless of their particular

structure... transform matter-energy and information and engage in adaptation..." (p. 438), were relevant to the design of this research.

This study was based on the assumption that the research/development participants would be interacting with their environments at the micro, meso, and macro²³ levels thus comprising a human ecosystem (see Figure 3.2). "Human organisms in interaction with their natural physical-biological, social-cultural, and human built environments comprise a human ecosystem" (Bubolz & Sontag, 1993, p. 431). The human ecosystem in El Salvador has been influenced through time by political, economic, religious, educational, environmental, and social issues.

Families have adapted to it, or created new, individual, human ecosystems to survive. "Adaptation is behaviour of all living things [e.g. family] that changes the state or structure of the system, the environment, or both...to reach desired outcomes" (Bubolz & Sontag, 1993:p. 433).

Feminism

According to The Balsam Association (unpublished), women in El Salvador are mainly responsible for maintenance of their families' well being, and in fact, 80% of Balsam's beneficiaries are women. For this reason, the use of a feminist perspective was considered crucial to designing the research, which is based on the premise that women are "agents, actors, creators of culture, and participants in the making of history" (Withers & Thorne, 1993, p. 593). This research is sensitive to gender differences, which need to be "highly esteemed" (Withers & Thorne, 1993, p. 608) throughout the research process. Withers & Thorne (1993) state that, "gender is... an extraordinary complex phenomenon, relevant to many dimensions of individual and social life" (p. 604). Several conceptualizations of gender exist in feminist theory. Two concepts and two assumptions were chosen for this research: Cultural gender, meaning "all of the learned and cultural phenomena

²³ Micro-environment refers to family level, Meso environment to community organization and institutional level and macro environments to society level.

loosely associated with biological sex” (Withers & Thorne, 1993, p. 604) and gender relation meaning “power relations” (Withers & Thorne, 1993, p. 605).



Figure 3.2: Human Ecosystem Framework

The concept of cultural gender generates understanding of female participation in the research/development and in the Salvadoran urban agriculture while the concept of gender or power relation provides a framework for interpreting female and male interrelations and actions while developing the research/development and urban farming.

Two assumptions from the feminist perspective have also been used to evaluate women's work as agents of change and to understand their motivations to farm in the city: "The centrality, normality, and value of women's (and girls') experiences" (Withers & Thorne, 1993, p. 592) and the need to analyse gender relationships within a socio-cultural and historical context (Keating, unpublished).

Depending on specific paradigms, the gender perspective of feminism is perceived differently by different women. This research was informed by two feminist models: the Gender and Development (GAD) model, and the Women, Environment, and Development (WED) model. These two feminist models recognise women's contribution inside and outside the household. They both recognise women as agents of change within the household, society and their broad environments. However, the GAD perspective emphasizes the way research/development participants use and recognize their power as "actors and agents directing their own lives...[mobilizing their] collective spirit and [channelling] it towards [their] specific goals" (Visvanathan, 1988, p. 29), while the WED perspective emphasizes the role of research/development participants on environmental conservation.

Indigenous Knowledge and Community Development

In attempting to combine research and development using EPAR, the concepts of indigenous knowledge (IK) and community development which are described below are of relevance. The concepts of IK and community development chosen for this research helped in the holistic analysis of indigenous knowledge and of those actions within the social, economic,

and political context of El Salvador. The concepts also assisted in determining the themes, refining the data collection methods, and selecting the data and information to be documented.

Indigenous Knowledge (IK)

The terms indigenous knowledge and traditional knowledge have been used interchangeably to describe the knowledge that has been handed down throughout generations from ancestral times (Agrawal 1995, Warren 1996). However, Brokensha, Werner, and Berkes (Berkes, 1999) have developed a dynamic concept of indigenous knowledge.

In 1980, David Brokensha, Oswald Werner and I were struggling to find a term that could replace 'traditional' in the designation 'traditional knowledge'...we wanted a term that represented the dynamic contributions of any community to problem solving, based on their own perceptions and conceptions, and the ways that they identified, categorised and classified phenomena important to them. At the same time, Robert Chambers and his group at Sussex were struggling with the same issue. Independent of each other, we both came up with the term 'indigenous'" (Warren, 1995, p. 13 in Berkes, 1999, p. 5).

However, for the purpose of this research, the term "indigenous knowledge" is used to describe more than just traditional knowledge. Here, IK is used to describe the "unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area" (Grenier, 1998, p. 1) and as "the understanding, practices and perceptions generated and transmitted over time within a particular or local setting that form the basis for survival" (Fernandez, 1994; Slikkerveer & Dechering, 1995; Stevenson, 1996; in Davis 2001, p. 21).

According to Equipo Maiz (1995), the Pipiles (ancestral native people) in El Salvador resisted assimilation into Spanish culture just as most Salvadorans, throughout the generations, have also resisted assimilating influences from other cultures. Throughout the years, they learnt to change or adapt in order to survive, incorporating selected knowledge brought by foreign

cultures to their country. Thus indigenous agricultural knowledge in El Salvador is currently a hybridization of traditional and modern knowledge²⁴. The research revealed that new knowledge is constantly added throughout generations to the specific local indigenous knowledge, and in this way IK is in constant development. “IK systems are also dynamic: new knowledge is continuously added. Such systems do innovate from within and also will internalize, use, and adapt external knowledge to suit the local situation” (Grenier, 1998, p. 1).

In this research, “indigenous knowledge” is then, used to refer to the knowledge, beliefs, and perceptions inherited by the research/development participants from their ancestors, which have evolved into the knowledge, beliefs, and perceptions currently used by each participant to produce food and generate income through urban agriculture. Every family member has her/his own way to contribute to farming activities. “All members of a community have *traditional ecological knowledge*: elders, women, men, and children. The quantity and quality of the IK that individuals possess vary” (Grenier, 1998, p. 1).

IK was a core concept in this research, as it explains the integration of all kinds of traditional and modern knowledge, as well as their influence on the actions that create human well being. IK was also important to this research because it was assumed that development is only successful when it is built on people’s own knowledge, and when people feel they are owners of it.

Community Development (CD)

The concept of community development includes a definition of community. The term community is used daily in the news, in school, in the church, and in any social, economic, cultural, or political arena. Community could mean a group of people living in a determined

²⁴The term modern is to refer to the techniques more recently developed through the technological advances of modern society. The term is chosen because this knowledge is rooted in modern scientific advancement, rather than to illustrate the validity or scope of implementation of the techniques.

geographical area, participating in the same church, or working in the same company. “By *community*, we mean a group of people who share a common place, experience, or interest. We often use this term for people who live in the same area: the same neighbourhood, the same city or town, and even the same state or country” (Fawcett, et al, n.y. p. 1). However, in this research, “community” will refer to more than a group of people sharing land, goals, or social, economic or political contexts. “Community is the context within which we all hope to live a life of health and wellbeing... **more important than the designated space or location of the community is the relational nature of community members**” (Ricks et.al.1999, p. 32). This concept is related to the central goal of human ecology: The betterment of human life (Bubolz, 1995) and the well being of people (Westney et al, 1988).

A developed community, then, is one in which all members live a healthy life. To reach that point, development needs to be carried out. In this way, community development is a process and a method for which “... the central assumption ... is that people and communities have inherent strengths, resources, talents, and possibilities for growth”. (Ricks et.al. 1999, p. 34). People make up communities. As a community, they are able to build healthy lives because communities provide “... something essential & vital to humankind which is worth saving & building further – a home base, a meaningful relationship with others, a personal identity, a mutual support system for our life endeavours, and the values of caring & sharing” (Nozick, in Pivnick, 1993, p. 3). Community development in this research is understood as the approach to planning and carrying out actions for “... safer lives in stronger families with less stress, better nutrition, more information and greater wisdom...[making] communities more democratic, wealthier, more interconnected, better educated and even happier” (Flower, 1994, in Ricks et. al. 1999, p. 34).

The community development concept was central because it helped to understand the variety of ways individuals can create healthy communities.

Other Central Concepts Used in this Research

The concepts of biodiversity, biological diversity, and micro-business offered insight into local resources and abilities for communities to potentially use research findings to create alternative development models. They also helped to understand research participants' environments and the way they perceive them.

Biological Diversity

The convention of biological diversity defines biological diversity as the “variability of living organisms from any source, including land and marine ecosystems and other aquatic ecosystems and the ecological complexes of which these form a part. It includes the diversity within each species among species and the diversity of the ecosystems” (Madrigal et al. 1997, p. 12).

Biodiversity

It is important to distinguish biodiversity from biological diversity. Although biodiversity is inherently related to biological diversity, it involves variables that are not considered in the biological diversity concept. Rather than merely considering the number of different species, the concept of biodiversity includes the diverse relationships of species with each other, with their environment, and the interaction of different ecosystems. “The term biodiversity emerges from the need to conserve the components of nature for the well being of humanity” (Madrigal et al. 1997, p. 13). For the purpose of the present research, I use the definition developed by Madrigal et al. (1997), “Biodiversity is an alternative to strict protection... [It] allows for the development and improvement of living standards for the people who live on and rely upon these resources over time” (p. 18). The concept of biodiversity is thus based on the idea that all realities are related, and thus environmental problems cannot be solved unless human problems are solved as well.

Micro-business

According to The Balsam Association, a micro-business in El Salvador has no more than five employees (including family members) and less than 50 thousand colones (US\$5,747) in assets. Three kinds of micro-business are distinguished in El Salvador: Survival, simple accumulation, and broader accumulation. Some of the main characteristics of them are:

- Survival, which are carried out by members of a family only. Sales are under US \$1700 per month. Do not have assets and profit. It is self under-employment.
- Simple accumulation, which are also carried out by members of a family only. Sales are under US \$3500 per month. Do not have profit. They can have assets up to US\$3000. It is self low-pay employment.
- Broader accumulation, are carried out by family members and employees up to five people. Sales are under US\$5,750). They have up to US\$5,750) in assets.

Micro-businesses has become a survival strategy for families in El Salvador when they were unable to find jobs in the local market. According to Madrigal et al. (1997), “from a historical point of view, it may be established that a close relationship exists between styles, patterns or models of production and the deterioration of the environment ...[and that] for several decades, the existing models of economic development have shown critical signs that makes them increasingly less viable” (p. 9-10). Consequently, organizing and developing micro-entrepreneurs is perceived as fundamental for a new economic development alternative.

Discussion of the Human Ecology Framework used to Design this Research

This research uses a meta-disciplinary approach that has a trans-disciplinary dimension. The theoretical framework combines knowledge and practices from different disciplines and even from the researcher’s common sense and practical knowledge. This has allowed the

researcher to develop the EPAR model (see Chapter Four) to understand how the research/development participants' applied indigenous knowledge in relation to their survival and developmental actions. The framework also allowed the revision and use of literature from a variety of disciplines, such as anthropology, sociology, history, ecology, botany, pharmacology, business, and economics organized by the principles developed in the theory mentioned before. In addition, it helped to perceive the mutual/causal connection between person-society and person-environment, and the structural connection between society and environment (Steiner, 1995). Something very difficult to achieve from one specific discipline. "An ecological perspective, as distinguished from a social systems perspective, must address the interactions between humans and all of their environments as these influence each other" (Sontag and Bubolz, 1998, p.122).

Each theory, concept or assumption is not enough on its own to generate understanding about what happens in the daily life of urban farmers. The combination, interconnectedness, and interrelation of all of them makes the theoretical framework an assertive model to understand the research/development participants' actions, knowledge, beliefs, and perceptions, and to combine their local knowledge with that of the researcher. As a result, the EPAR model was perceived as a tool for research and development, and for generating and using "knowledge in service toward the mission" (Bubolz and Sontag, 1988, 125), a human ecological mission that understands "the human relationship to the natural world [which is realised] in terms of human cultural beliefs and practices [and] deals with value issues while other disciplines are 'supposedly value free'" (p. 123).

Chapter Four: The Method: EPAR

Introduction

In this chapter I introduce the Ecological Participatory Action Research (EPAR) model. EPAR is a collaborative community-based research/development approach grounded on the site context, in this case the Salvadoran context. EPAR's main purpose is to integrate internal and external knowledge and methods to create healthy ways of life for communities through environmentally friendly urban agriculture. In the present chapter, I will first present the justification and rationale of EPAR. Secondly, I will introduce the components of EPAR. Thirdly, I will describe the values of the model. Finally, I will explain the need of the EPAR model and the process followed to develop it. When referring to the components of EPAR, this chapter introduces a description and objective (what and why) of the methods and techniques that were combined in EPAR during the fieldwork. The concrete ways of combination/interrelation (who, where, when, etc.) are describe in Chapter Five.

Justification and Rationale

I developed the Ecological Participatory Action Research (EPAR) model based on my experience using participatory approaches in community development in El Salvador, Nicaragua, and Canada since the 1970's and my deep desire to sustain any community-based initiative that would address the problems mentioned in Chapter Two. I was encouraged to search for a holistic human ecological approach that combines research and development by the complex Salvadoran context, and by my long history observing how poor Salvadoran people struggle to meet their basic needs while their environment gives less and less to meet those needs. The research component needed to identify the knowledge and approaches that help farmers to succeed in producing food and medicinal plants while protecting the environment. The development component needed to help participants use both their indigenous and modern knowledge and

approaches to take innovative steps to address their problems. By combining the two components, I was able to collect data from participants while participating in the development process of the community.

As noted above in Chapter Two, combining research and development is necessary because of the poverty and depletion of natural resources in El Salvador. Malnutrition is one of the forms in which poverty is expressed. “The nutritional situation in El Salvador is dire. Many households lack basic foods such as corn and beans up to four days a week” (Hochachka, 1999, p. 25). Similarly, two ways in which depletion of natural resources is expressed is in the loss of plant biodiversity and the loss of soil fertility. These problems have caused socio-economic hardship for the rural population and led to urban migration, as people look for new survival alternatives.

However, individuals cannot simply solve their socio-economic problems by moving to the city. A 1992 census showed that 55% of the population was concentrated in urban areas (Cavada, et.al. 2,000). The urban population has likely increased since then, although the rate of increase has slowed (Aguilar, unpublished). The cities have expanded, destroying the few city green areas. An increasing number of families live in extreme poverty because migrants have not been able to find jobs. In urban areas more than 60% of the population are micro-entrepreneurs and the urban migration of poor small farmers has led to urban farming which, in the majority of cases, has not succeeded (see definition of success in Chapter One), (Balsam, personal communication, April 24, 2000).

Development organizations such as NGOs, government environmental agencies, and community organizations have a long history of implementing alternative solutions to those problems. They use different and sometimes opposing paradigms for research and/or development. For instance, some of them have used conventional approaches, whereas others have used PAR or other participatory approaches. These approaches have resulted in solutions of limited success and in some instances have aggravated the situation by acknowledging and

addressing violently the disparities that exist between people and between developed and developing countries. People from each side defend their own interests and identify the other side as the enemy, leading to wars as the one that happened in El Salvador in the 1980's.

Currently, community organizations and institutions are searching for alternative solutions to the Salvadoran problems in two ways: First, they encourage negotiation rather than confrontation among the parties in conflict of interests, in this way avoiding another civil war. Second, they include strategies for using and conserving national natural resources.

Si en verdad decidimos capitalizar la riqueza humana y los recursos biológicos que hemos heredado, pensando más en un futuro que en un presente de bienestar efímero, podremos salir con facilidad de la situación actual (Estrategia Nacional, 2000, p. 6).

If we truly decided to capitalize on the rich human and biological resource we have inherited – thinking more about the future rather than a temporary well-being – we would easily improve our current situation (Author's translation).

This thesis provides the above mentioned institutions and community at large with the Ecological Participatory Action Research (EPAR) model, an approach to research at the same times as creating innovative viable solutions to poverty and environmental problems in El Salvador.

For years, I thought the gaps among underdeveloped and developed countries and between the rich and poor could be reduced only by violent means. It is not because that is what people want but because it is the only choice left for peasants who want a better future for their children and for those who want to maintain the status quo. However, being from a developing society and living in a developed country, in other words, being both a member of a developing and a developed society, encouraged me to search for a research/development model that mediates between conventional and participatory approaches to be able to link opposing parties. I decided to develop and test EPAR, linking PAR with ethnography and the agenda based evaluation model to create links among people with different paradigms, cultures, and countries.

These links may help them share knowledge and approaches, solving poverty and environmental problems by addressing specifics such as food production through urban farming, as in this research.

The necessity to develop the Ecological Participatory Research (EPAR) model instead of using PAR or any other participatory method in this research lies in the Salvadoran context. In El Salvador, PAR goes a long way towards providing the necessary research method, but it has limitations (to be further explained below) that I needed to address during my fieldwork hence the development of the EPAR model. The Salvadorans requires a human ecological approach to deal with their situation that was not available in the methodological literature investigated (Sontag & Bubolz, 1988, Westney et al, 1988, Hurst, 1995, Hammersley & Atkinson, 1995, Smith et. al, 1997, Huizer, 1997, Sillitoe, 1998, Gibson & Gibson, 1999, Rothe, unpublished, & Gibson et al, In press, among others).

Components of EPAR

EPAR is an important and radical approach that attempts to resolve problems that have not been solved with existing PAR models in El Salvador, such as the contrast between the modern and the traditional, the rich and the poor, and the North and the South. As PAR does, EPAR combines investigation with capacity building and community action, empowering both the research participants and the researcher, while providing and collecting data. It is a method for the scientific and holistic study of humans as individual and social beings in their diverse interrelations and interconnections among them and with their natural and cultural environments at the micro and macro level. It helps to make people aware of their own IK and the need to meaningfully share and build on it so that they can contribute to the creation of a new society. The dissemination can be accomplished through the shared experience of different categories of knowing, such as the Spanish language, art, stories, narratives, experience, faith, feelings, and

emotions. The “optimal results of interaction between individuals and their environment [will be ideally a new kind of society]” (Westney, et al., 1988, p. 134).

In addition, the data generated using the EPAR model will show potential solutions to specific problems in El Salvador, such as diminished food production and environmental deterioration. In other words, the EPAR is a tool for helping research/development participants initiate a process of fulfilled life and wellness. The EPAR integrates the Participatory Action Research (PAR) approach, the ethnographic approach, the agenda based evaluation model, and the researcher ‘s values as well as her/his practical knowledge and experiences. However, the EPAR model is greater than the sum of its different components, it is a holistic web that interrelates, interconnects and integrates all of the parts, forming a research/development process.

Participatory Action Research (PAR)

This method provides the basis for EPAR. The participatory action research (PAR) approach is a community-based research approach “known variously as participatory research,... action research, and so forth” (Gibson et. al. (u.p.). According to Smith et. al. (1997), the PAR approach is a process of education, analysis, action, and investigation. It is a process that must be carried out systematically and consistently by the community with the help of the researcher. Together, they take actions and try to make changes, looking for solutions to concrete problems and conflicts. Although the term PAR has been used indistinctly to name a variety of participatory research approaches, I have used it, as Smith has used it as a unique model that is based on the research participants’ context (Smith, et. al. (1997). I distinguish three other participatory research approaches as the roots of PAR: action research, people’s participation, and participatory research.

Action Research:

Action research (AR) is participatory research for development. It was used in social psychology helping minorities by Kurt Lewis in the U.S. before and during the Second World War. Since then, it has been used by social scientists in different countries and from different disciplines to organize, develop and evaluate community programs (Huizar, 1997). “Action research ...emerged ...as a form of social research in which the researcher learns about certain group processes or change processes by actively participating in or manipulating certain aspects of these group- or change processes. It is a kind of learning by doing” (Huizar, 1997, np).

People's Participation:

People's participation (PP) is perceived as an “active process in which people take initiatives and action that is stimulated by their own thinking and deliberation and which they can effectively influence” (FAO, 1991, np). It is a developmental approach that has been used since the 1960's by a variety of national and international agencies in practical research and project evaluation. It helps to get input from project participants, inform the decision-making and implementation processes, and carry out social economic projects that respond to the needs of people. It is “more than an instrument of implementing government projects... It ...recognises the need to involve disadvantaged segments of the rural population in the design and implementation of policies concerning their well-being” (FAO, 1991, n.p).

Participatory Research:

Participatory Research (PR) is community-based research for development that emerged at the beginning of the 1970's in Tanzania. It aimed to encourage research participants to produce knowledge for their own well being.

PR...is the result of the on-going effort in popular education to come to grips--in both theory and practice--with the question, What is knowledge and what gives it credibility in a society that aspires to be genuinely

democratic?' ... It asks and provides working answers to these basic questions: what knowledge is to be produced, by whom, in whose interest, and to what end? It assumes that in a truly democratic society, knowledge is not simply *for* the people, but created *with* and *by* the people. Thus, it validates each person's right to speak, regardless of such factors as socio-economic status, class, or race (Hurst, J., 1995, np).

Participatory Action Research, then, is a community-based approach for research and development that promotes partnership among people and institutions, who share or potentially would share philosophical views for social change that can benefit all human kind. According to Smith et. al (1997), the PAR model follows a spiral process integrated by six internal processes (Figure 4.1). Each process is interrelated with the others, but not necessarily consecutively. The process of PAR usually includes the following phases:

The starting point is usually the **self-knowing process**, where each participant develops a deep desire for social justice and commitment.

- The second step is the **making connection process**, which creates a sense of community.
- From the first two processes emerges the **exploring circumstance process**, which grounds the research project in reality and initiates the setting of the provisional goals.
- From these goals, the core of the **PAR process** starts: a) education by analysis, b) action by solving problems, and c) investigation by documentation of experiences.
- The fourth process usually leads to a **deep awareness process**, as people understand better their capacity to transform reality and their ability to create social knowledge.
- The last step is the **awakening** of the participants in a context where they have won the right to speak and be listened to, and where they develop a healthy sense of self.

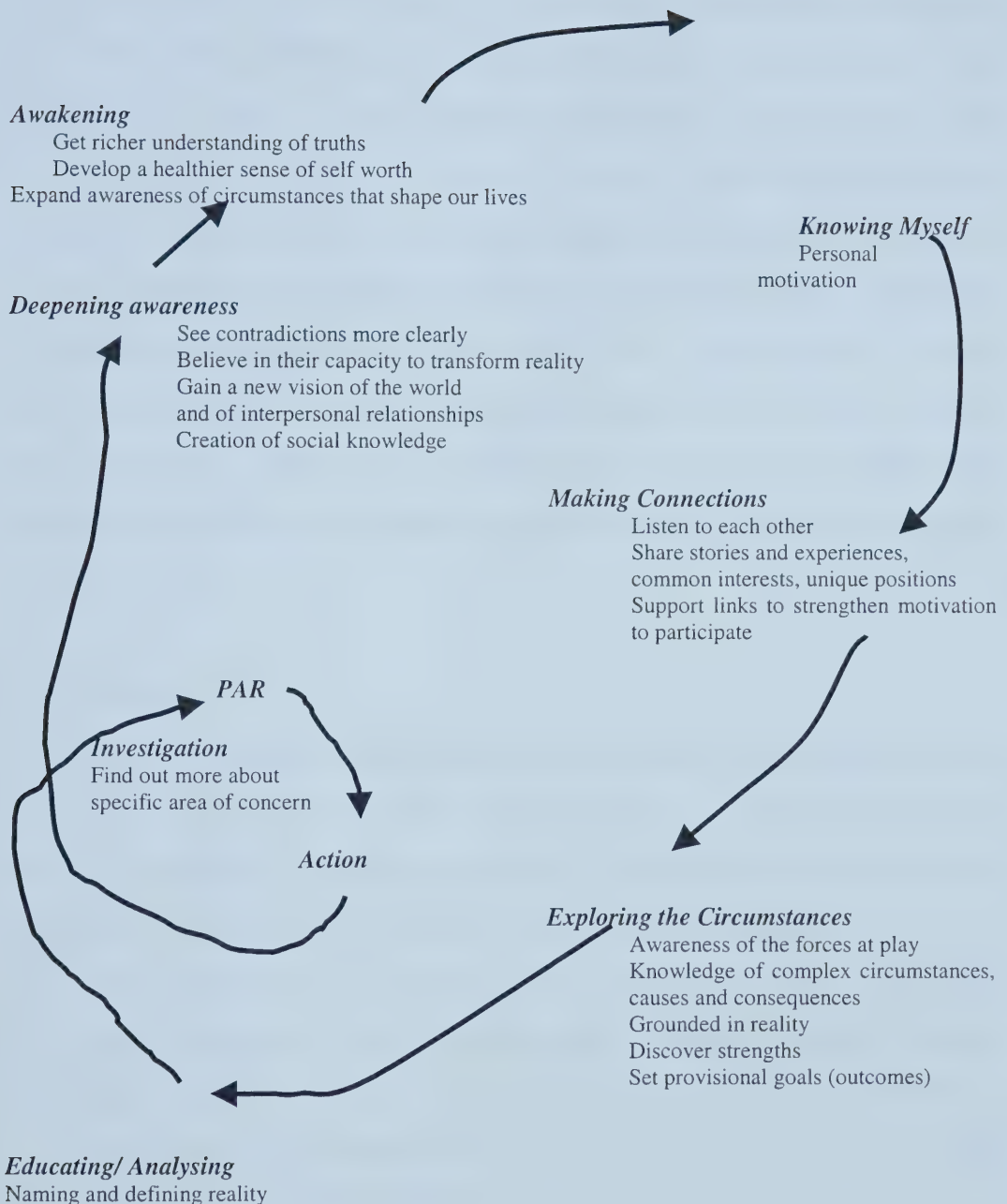


Figure 4.1 The PAR Spiral Model

Source: Smith S. et al (1997, p. 198). Adapted by Yvonne Chiu, the "Cultural Broker Network". Edmonton 1998, and the researcher.

PAR allows the use of any data collection technique as long as research participants can adapt it to their reality, facilitating collective decision-making, empowerment, capacity building, and community initiatives. “A successful PR project does not depend on specific methods of data collection or analysis... seldom do PR projects use only a single method” (North American, 1998, p.4). I decided not to adopt techniques from conventional models to use within a PAR process but to integrate ethnography as a conventional approach within the participatory methods such as PAR and the agenda-based evaluation model. PAR by itself does not meet the needs to sustain research and development for which rich and poor, developed and non-developed countries would come together. In this research, a method unique to Latin American PAR research called *pasantía* mainly used in Latin America-based research, was adopted by the EPAR and adapted to its needs.

Pasantía

Pasantía was used in combination with participant observation. It is a set amount of time spent in a community, analysing collaboratively while observing and doing. This method emerged in 1992 during a PAR process in Esperanza, Honduras where community members participated in a health project co-ordinated by A. Ornelas (a Mexican researcher).

The research/development team started by asking themselves what kind of training should take place. People rejected workshops, courses, and seminars. Instead, they proposed a *pasantía* which, roughly translated, means “passing through with a critical eye and personal fulfilment”. People decided that it should last three weeks and participants should decide the content (“Recovering community”, 1993, p. 13).

In the present research, *pasantía* was assumed to enhance research participants’ capacities or build new ones for them to empower themselves to be fully involved in sharing knowledge and taking collective decisions on the research design, process, and the data gathered

and in making the necessary changes for them to improve their living conditions, thus creating new knowledge. This means that the participants as a group, including the researcher, have the authority during the research process, establishing a win-win relationship and allowing the researcher to gather data for this research/development project and insights for personal growth. Although *pasantía* was used in Honduras to avoid workshops, courses, and seminars, for the present research, the researcher and research/development participants selected meetings, workshops, team building, and a conference as the main techniques to be used during the *pasantías*. These activities, developed within the context of a *pasantía*, acquired a special meaning as each action included in each *pasantía* is planned and organized by the participants during the same *pasantía*. In other words, *pasantías* allows organization of the activities that happen during the *pasantías*. The researcher was a facilitator, a provider and a recipient of some of results and benefits of each action.

Meetings

Meetings were events where participants provided new information related to the research/development process along with analysing, discussing, and learning. The objectives of these meetings were to get new information related to urban agriculture and conservation of biodiversity in El Salvador and abroad, and motivate participants to participate in the research/development process or in the follow up activities. They negotiated training goals, selected and approved the training themes, and shared and analyzed knowledge and information.

Workshops

Workshops were designed to address the research participants' skill development needs. This involved presentation and analysis of the research proposal and bibliographic research

findings and methodological training. Workshops were also safe spaces for participants to provide information relevant to the research.

Team Building

Team building was a process in which participants in each community engaged in formal and informal activities, such as tours, birthdays, anniversary celebrations, and other social gatherings. The objective of these activities was the creation of effective links to facilitate interconnectedness and mutual support, which also enhanced the capacity building process.

Urban Agriculture and Biodiversity Conference

The conference mentioned at the outset in Chapter One was used in this research as the main tool to celebrate the learning that took place during the research process. It was also an opportunity to disseminate the preliminary research findings in El Salvador among NGOs, community representatives supported by Balsam, farmers and others wishing to undertake community development projects within the country. The objective of the conference was to convey the experience and knowledge gained by all research participants during the fieldwork. Basically, the conference was an opportunity to share the new knowledge and get input to improve the EPAR process as a viable strategy for combining research and development. It was also an opportunity for communities to encourage each other and for NGOs, and others from the private and public sector to express their support for urban agriculturists. Even though this was a day-long activity at the Balsam headquarters, it was organized and planned during the community *pasantías*.

Ethnography

The ethnographic approach is important in this research/development project as a component of the EPAR model. It complements PAR because ethnography was designed to document cultural and agricultural IK, beliefs and philosophies. It can facilitate understanding the significance of urban agriculture practices for community development. “An **ethnography** is a description and interpretation of a cultural or social group or system... that has its genesis in cultural anthropology through the early 20th-century” (Creswell, 1998, p. 58). The difference between ethnography and participatory approaches like PAR lies in the concepts of emic/etic or insider/outsider. The anthropological perspectives assume that it is possible to get the insiders’ perspectives by observing or listening to them. Participatory methods assume that there is no singular perspective within a particular culture. Differences such as gender, social, political or economic status are determinants of people’s perspectives (Gibson and Gibson, 1999, p. 5).

In consideration of both the PAR and ethnography perspectives, EPAR adopted ethnographic techniques but changed or even reversed the way they are normally used. The “Ethnographer begins the study by looking at people in interaction in ordinary settings and by attempting to discern pervasive patterns such as life cycles, events, and cultural themes” (Creswell, 1998, p. 59) while in this study, discerning was a collective activity. “ ‘Informal interviewing is the method of choice during the first phase of participant observation, when you’re just settling in and getting to know the lay of the land. It is also used throughout fieldwork to build greater rapport and to uncover new topics of interest that might have been overlooked’ ” (Bernard, 1995, p. 209). In this study, informal interviews were used at the end of the research process once a trusting relationship was strongly developed and participants were comfortable verbalising their actions, beliefs, knowledge, and philosophies. “The value of ethnography as a social research method is founded upon the existence of such variations in cultural patterns across and within societies, and their significance for understanding social processes” (Hammersley & Atkinson, 1993, p. 9). The main ethnographic techniques used

during the research/development process were hanging out, participant observation, and interviews.

Hanging Out

Hanging out or the engagement in informal social activities where one can talk with people while observing/participating in family or community activities is a technique used to engage and build trust among participants and get familiar with their context. “Hanging out builds trust, and trust results in ordinary conversations and ordinary behaviour in your presence. Once you know, from hanging out, exactly what you want to know more about, and once people trust you not to betray their confidence, you’ll be surprised at the direct questions you can ask” (Bernard, 1995, p.152).

Participant Observation

“Participant observation is a strategic method that lets you learn what you want to learn and apply all the data collection methods that you may want to apply” (Bernard, 1995, p. 151). In this research/development project, participant observation helped the researcher to participate in the daily life of the community by observing the people involved. It provided access to the daily life of urban farmers, recording and describing the “most routine and taken-for-granted aspects of [their] reality” (Rothe, unpublished, p. 73) as “knowledge arises directly from practice, rather than from reflection about it” (De Souza, 1988, p. 31). It was also used to capture “data from individuals who could not normally speak” (Rothe, unpublished, p. 121). Women in marginalized communities usually are quiet and tell more by doing than by talking, so observation of their pattern of activities and relationships is very important.

Interviews

Informal Semi-structured and Semi-open Interview

Informal semi-structured and semi-open interviews are questions, which can be modified in the course of the interview, and used to gather information directly from participants. "In informal interviews [the researcher, rather than relying on a list of questions, has a] list of issues to be covered" (Hammersley & Atkinson, 1993, 153). This technique was used to record how participants verbalise observations, which were recorded through the *pasantias* (see above) and participant observation, and their knowledge, beliefs, and philosophies in relation to urban farming.

Oral/Life History Interviews

Taylor and Bogdan (1984) describe the life history as a description of 'the important events and experiences in a person's life,' told in ways that capture 'the person's own feelings, views, and perspectives' (p.143). The life history is often an account of how a new person enters a group and becomes an adult capable of meeting the traditional expectations of that society for a person of that individual's gender and age (Marshall and Rossman, 1995, p. 88).

This technique helped to record relevant data about factors that historically have influenced the changes in women's farming philosophy. It allowed people interviewed to disclose all that they wanted to say (Rothe, unpublished) in relation to their cultural and agricultural philosophy.

Agenda Based Evaluation Model

The agenda-based evaluation model is the third research strategy incorporated by the EPAR model. The agenda-based evaluation model is an approach to building collaborative community-based research models. "Collaborative research, for the purpose of this discussion, is research which involves the community being studied as an equal partner with the other institutions involved in the study, e.g., universities and/or governments" (Gibson and Gibson, 1999, p. 2). The

importance of this approach to the EPAR model in developing this study is because the research/development process involved people, institutions, and communities from the North and the South (see Chapters One and Five), which demanded a negotiation process for research design, execution, and dissemination. In the agenda based evaluation model, “the knowledge and expertise of all collaborators are considered complementary... It involves developing realistic expectations about what one group can and cannot contribute ...[and] permits the expression of ethical principles and the integration of these principles into the research design” (Gibson, et. al., in press, p. 2 and 5). During this research, each research participant, community, or institution brought their own agenda. The agenda based evaluation model also helped to “measure the process of negotiating the goals ... [and] evaluate the stakeholders’ perspectives of the project’s effectiveness” (Gibson et al. In press, p. 4). It “does not follow a restricted and rigid research methodology... does not replace other forms of research” (North American, 1998, p.4). Document and bibliographic analyses, meetings and workshops were the main techniques incorporated from this model.

Document and Bibliographic Analysis

“The use of documents often entails a specialized approach called *content analysis*...[which] entails the systematic examination of forms of communication to document patterns objectively” (Marshall and Rossman, 1995, p. 85). Document and bibliographic analysis technique included two activities: The revision and analysis of documents written about urban farming by the institutions involved, and the revision and analysis of books and/or articles written to inform about the Salvadoran context.

In evaluating community-based research, it is often difficult to assess the influence of invisible contextual factors of the project. For each community, there is an outer circle of unique factors that affect overall community status: for example geography, history, culture, politics, environment and economics (Gibson, et. al., in press, p. 8).

The information documented using this technique (see Chapter Two) is the “body of literature” (Ellen, 1984, p. 160) that backed this research project. “If research questions and projects are to be contextualized, then the cultural, social and economic factors that define each collaborating organization need to be outlined” (Gibson and Gibson, 1999, p.3). This information also helped in three ways:

- Helped the researcher to understand the participant’s context and their actions, and to address their problems.
- Helped the participants define their developmental actions.
- Helped to validate the EPAR as a tool for research and development, leading participants to create new community developmental initiatives.

Just as participatory research enhances validity by including contextual factors, so too is the validity of the research relationship is enhanced if the context of all parties is understood” (Gibson and Gibson, 1999, p. 2).

Meetings

Meetings were reunions of people where collective decisions were made. They were used to negotiating the goals, to discussing the research plan and process, and taking the necessary decisions in how to continue researching/developing for meeting each one’s goals.

Workshops

Workshops were “learning while doing” reunions. They were used for planning and writing project funding proposals for their new community development initiatives. As mentioned above, meetings and workshops allowed data to be gathered from groups.

The Values of EPAR

The EPAR is not only about methods and techniques. It is also and above all, about love, trust, hope, and faith, which are the core values of the research/development process. Love is the strong force to build trusting relationships, which leads to a better communication process, information interchange, and understanding. Love leads researcher to feel research/development participants' needs as their own, thus converting all of them into a team that together looks for the best solutions to their problems. After all, the heart and the brain working together can accomplish much more than if they work separately.

The second value is trust. I distinguish two kinds of trusting relationships that usually occur within a research/development process. One occurs at the beginning; it comes from a mutual understanding of the project's goals, when they are collectively negotiated. From the collective work, the action plans are developed. "Community-researcher relationships should be established in the planning process. These relationships are facilitated and strengthened by written agreements that outline the formal obligations of each partner throughout the research process" (Gibson, et. al., in press, p. 9). In other words, when a win-win business is created every participant feels sure she/he will get something during or after the project develops. "The actual process of defining the strengths, limitations, and resources of the collaborators can contribute to the establishment of trust among the collaborators" (Gibson and Gibson, 1999, p. 3). The second kind of trusting relationship comes when the researcher and participants have developed feelings for each other. I base this idea on my assumption that love is an art, so it can be constructed. This kind of love is the one that brings and/or strengthens the values of hope and faith that can build a better future for all. The four values combined facilitate a more meaningful communication process.

From my experience working with peasants in El Salvador, I know they do not trust others easily. Some peasants are afraid of researchers, especially from the ones that come from the North, even when they are, like me, Salvadoran by birth. They are worried the researchers

might have hidden agendas or unrecognised goals. Learning to love others was the solution to mistrust and the guarantee of success of this research/development process.

The Inuit Tapirisat of Canada notes that the legacy of conventional research in northern communities includes many different sorts of failures: exclusion of the study community from the research process, inaccessibility of results, inappropriate interpretation and dissemination of results, and lack of benefit to the communities...These failures have resulted in feelings of being used and betrayed in the research process and an unwillingness to participate in future research endeavours (Inuit Tapirisat of Canada, 1993 in Gibson, et al. In press, p. 3).

By including the values of love, trust, hope, and faith the EPAR model helps to avoid the problems of conventional and even some participatory research. "The insider/outsider distinction can become an unnecessary barrier to the establishment of the trust relationship, which Bartunek and Louis (1996) correctly identify as an essential component of collaborative partnerships" (Gibson and Gibson, 1999, p. 5).

Discussion of the Need for EPAR and how EPAR is developed

As a human ecological strategy, the EPAR is needed for the current and future well being of all living things. In the case of this research/development project, this includes people and plants. According to Human Ecology, all of the human environments are closely linked and in constant interaction. A social change is needed to create and maintain an optimum balance among those environments.

While EPAR is strongly informed by PAR, EPAR is not a specific way to develop PAR or any other participatory approach, but an evolution of them. EPAR is both the tool used for this research/development process and a product of it. It holistically combines existing methods with practical research/development approaches and values of the researcher and researcher/development participants as well as approaches for community development through small-scale urban agriculture. The EPAR is not only about methods and values, but also about

people from opposing worldviews working together. It is about the need to link, negotiate, mediate, and bridge among different, and often opposing cultures, interests, and paradigms.

By using conventional methods, researchers define “the research problem, and who generates, analyzes, represents, owns and acts on the information resulting from the research project” (North American..., up, p. 4), meaning that “experts” interpret people’s realities, creating knowledge for everybody, and making decisions that must be followed by the lay people. The contrary is expected to happen when using participatory approaches. They are perceived as a “ ‘ world view about the conduct of research, rather than a linear, delineated procedure for collecting evidence’ ” (North American, 1998, p.4). They are conducted with people when they “form a group with a common purpose, investigate their situation, and make decisions to take actions that re-form power and create justice, their reality is transformed. In so doing, they also are transformed - losing fear, gaining confidence, self-esteem, and direction” (North American..., up, p. 3) or “with people who have a strong sense of being a community, who share a history and have mutual geographical cultural, social, political, or economic interests” (Gibson, et. al., In press, p. 2). In conventional research, then, the research process is designed and led by the researcher with the support of the research participants, while in participatory approaches, the research is designed and led by research participants with the support of the researcher.

The reality is that individuals are complex and so are families and communities. Individualism has long been associated with humanity and is very difficult to avoid. Moreover, individualism is a highly esteemed value in some cultures, especially in the North. How can people with different cultures, beliefs, or interests come together to search for solutions to problems such as poverty and environment that to different degrees affect everyone? The EPAR model addressed these problems.

The EPAR assumes the six processes of PAR (see Figure 4.1), but gives new content and strategies, specially related to interconnectedness and sustainability (see Figure 4.2). In PAR, the starting point is the researcher’s own motivation. In the EPAR, it is not only about the

researcher's motivation, but also, and specially, about the researcher's worldview and her knowledge and experience, which definitively affect the research process and data interpretation. Moreover, it affects the sustainability of the research project as a whole, as the researcher is committed to continue supporting fieldwork participants once the research/development process is finished. A researcher using the EPAR model acquires a moral long-term commitment to the community investigated.

Besides making connections to create a sense of community as in PAR, the EPAR model further searches for the research project's sustainability and expansion by connecting traditions and modern knowledge, and people from the North with the South. Whereas PAR facilitates partnerships among institutions with similar paradigms, EPAR promotes negotiation, linkage, and mediation among parties in conflict, facilitating a process of creating new national and international community development initiatives in which the gaps previously mentioned can be reduced. It facilitates the interchange of knowledge, experience, and resources, while emphasizing the need to understand interactions within specific socio-cultural contexts. In this way, avoiding conflicts between opposite parts is considered a positive action, as is trust in the goodness of humanity and willingness to avert the planet's destruction. For this reason, the EPAR allows the researcher and research/development participants to be creative and critical in the decision making process, and enhance their abilities to reach ecologically sound decisions for the well being of humanity and the harmony on the planet (Strauss 1990).

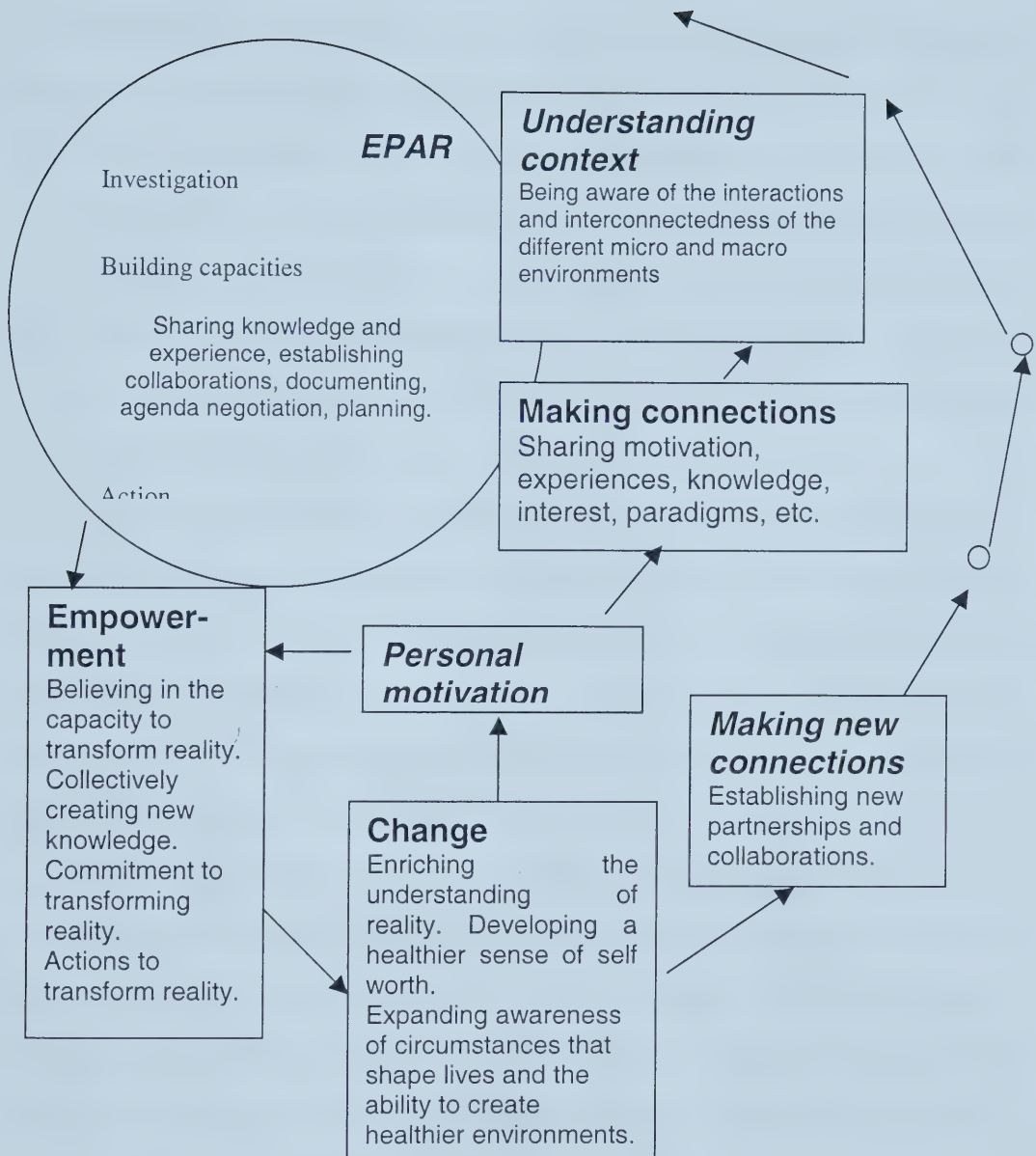


Figure 4.2: Ecological Participatory Action Research model as seen from the perspective of the author

Source:

Adaptation of the PAR model developed by Smith S. et al (1997, p. 98)

Originally when I started thinking about this project I planned to use PAR. Moreover, I designed and developed the BOB project mentioned in Chapter One, believing that PAR was the best approach to combine research and development. However, I soon realized that PAR was not sufficient for the reasons discussed above. The difference between PAR and EPAR is the E, but it is not only semantic. Ecological means interconnectedness among unequal parties to create social economic initiatives that benefit all local community members and the community at large, at the international level, without negatively impinging on the ecosystem. The EPAR enables interrelating and integrating of the different parts of participants' ecosystems, combining research and development to produce and use new knowledge.

In summary the EPAR model is a collaborative community-based research/development approach whose purpose is to integrate internal and external knowledge and methods to create healthy ways of life for communities through urban agriculture. EPAR links the participatory action research model (PAR), ethnography, agenda based evaluation model, the researcher and research participants' values and practical knowledge and experiences, and approaches for community development through small-scale urban agriculture.

PAR provides the basis for EPAR as it involves a process of education, analysis, action, and investigation. By using PAR, researcher and research/development participants took actions and made changes, looking for solutions to concrete problems. Ethnography facilitated understanding the significance of urban agriculture practices for community development. The Agenda based evaluation model facilitated negotiation processes for research design, execution, and dissemination among people, institutions, and communities from the North and the South. All approaches and knowledge integrated in the EPAR model which facilitated a research/development process greater than the sum of its different components and created links among people with different paradigms, and cultures, promoting dissemination and sustainability of the research/development project.

Chapter Five: Application of EPAR: The Field/Development work in El

Salvador

Introduction

As stated in Chapter One, this research/development model presented in this thesis involved preliminary work, which included the creation of the Building on Biodiversity (BOB) project (see Chapter One). Had I not participated in the creation, organization, and development of BOB, I would not have been able to create and test EPAR. Moreover, the creation and development of BOB motivated me to pursue this research/development project and prepared the field/development work.

The first process of EPAR as in PAR is the self-preparation of the researcher. In my case, this was done in the context of BOB before starting the field/development work. I assessed my knowledge, skills, paradigms, values and beliefs and I increased my ability to share and use them for the benefits of the participants of this study. To know who I am, and why I wanted to do this specific research was essential. “What each researcher observes and interprets is never independent from his academic background, his previous experiences and his own involvement with the situation under investigation” (De Souza, 1988, p. 34).

The second process is making connection. In this research, this involved the creation of a bilateral network between The Garden Institute and Alberta Institute for Grass-Roots Community Eco-Initiatives from Canada, and the Asociacion El Balsamo/The Balsam Association and la Red de Agricultura Urbana/ the Urban Agriculture Network from El Salvador. This network is the system that supported this research and would guarantee its further sustainability. Once the BOB project and the bilateral network were created, it was possible to test EPAR as a model combining research and development during four months of field/development work in El Salvador. During those four months, four of the six EPAR

processes were carried out. This chapter describes those four processes as well as the research site and the research/development participants and the description of the data recording and analysis techniques, concluding with a discussion about the way EPAR was used.

Research Site and Research Participants

Selection of Research Participants

I used a purposive or judgement sampling process to choose the families for this study. “In judgment sampling, you decide the purpose you want an informant (or community) to serve and you go out to find one... there is not an overall sampling design that tells you how many of each type of informant you need for a study ...it’s not even necessary to decide up front what *kinds* of units of analysis to study” (Bernard, 1995, p. 95). The sampling framework was the list of communities and community members developing urban agriculture supported by Balsam. The researcher and the urban agriculture network preliminarily developed the sampling criteria during the exploratory phase of the BOB project (see Chapter One). The criteria used when choosing the communities included:

- High level²⁵ of participation in the Needs Assessment and Strategic Planning developed by Balsam during the Building Connections for an Urban Agriculture System phase of BOB-El Salvador project
- Access to a communal plot of land that can be used as a model garden for training
- Environmental site assessment developed by the Canadian soil scientist during the exploratory phase of BOB project (see Appendix 5.1)

The criteria used when choosing direct participant families within each community were:

- Have been cultivating a variety of plants on the same small plot of land for at least three consecutive years thereby demonstrating that they protect the soil from depletion.

²⁵ This refers to communities represented in all focus groups, meetings, and workshops developed during the process.

- Have a strong background in supporting and leading development initiatives in their community.
- Have a strong background in urban farming and micro-agro processing²⁶, especially related to food, natural medicines, and cosmetics.

A category of indirect participants was also defined. These were micro-entrepreneurs that represent their communities in government, NGOs, funding agencies, and other external institutions to deal with community issues.

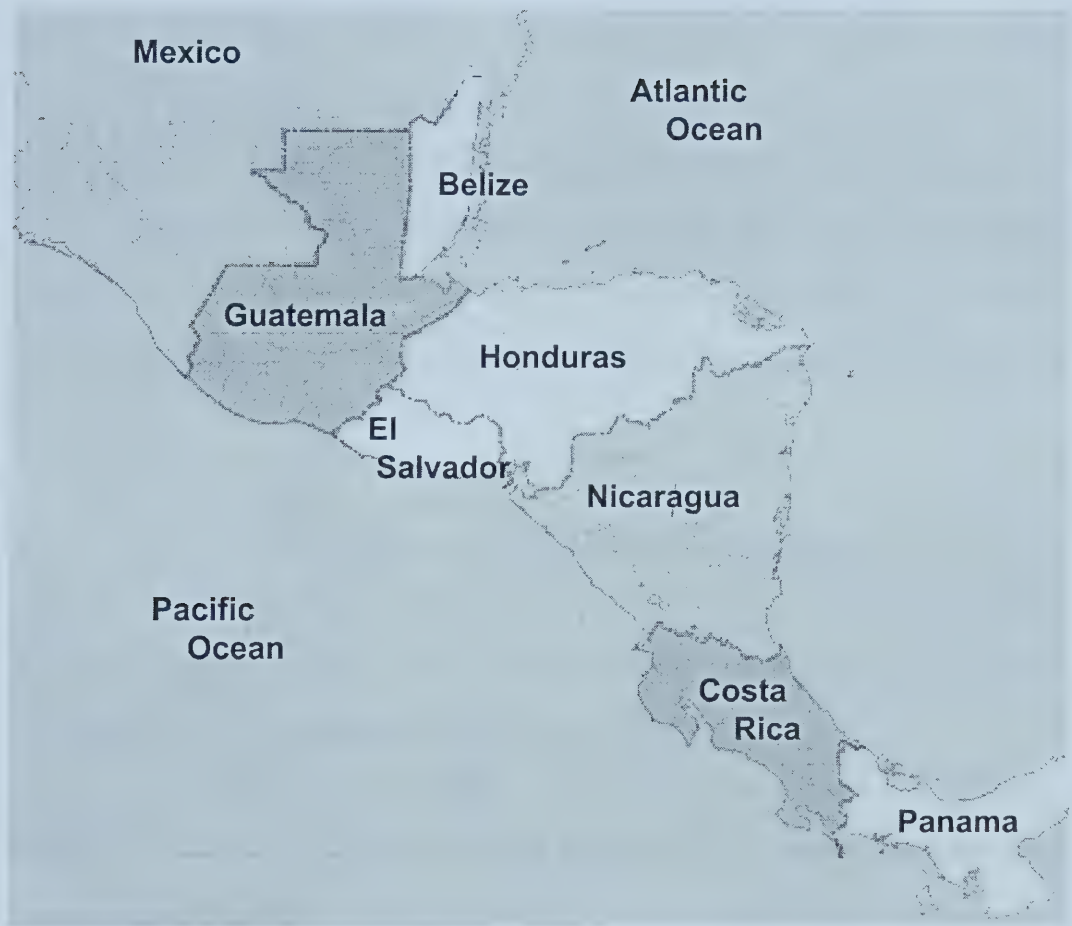
Arenales, Isla I, Mireya II, and San Jose Cortez were the communities that met all the criteria. However, on May 2000, Isla I “was affected by an explosion at a nearby military base [in which] a number of people were injured and it [was] thought that the soil in the area may [have been] contaminated” (Luther, u.p.). As a result of this event, I decided to carry out the research in Arenales, Mireya II, and San José Cortez. However, once I was in El Salvador and ready to start the field/development work, I was advised not to go to Arenales by myself or use public transportation due to security reasons. As a result, representatives of Balsam and the Urban Agriculture Network replaced Arenales by El Limón, a community that also met the criteria as it has access to the site at San José Cortez that was assessed environmentally. All three communities are in the department of San Salvador, which is divided into 19 municipalities (see Map 5.1). San Salvador is located in the country of El Salvador in Central America (see Map 5.2).

²⁶This refers to small scale agricultural processing

Map 5.1: Department of San Salvador (Errol Billing)



Map 5.2: Central America (Errol Billing)



Three families from each community were chosen as direct research participants: Tránsito Hernández de Vasquez, Ricardo Cortez Rosales, and Santos Rivas v. de Lopez from San José Cortez; Rosa Emérita Martinez Gomez, Virginia Carbajal Méndez, and Nidia Aracely Rivera from El Limón; and Juanita Lovato Galvez de Barrientos, Laureana de Jesús Torres, and Miguel Hernandez from Mireya II. Originally, my intention was to work with all family members; however, not all of them were able to participate mainly due to age and employment limitations.

The snowballing sampling technique was used to choose family member participants for each specific activity, explained as follows: “In snowball sampling you locate one or more key individuals and ask them to name others who would be likely candidates for your research” (Bernard, 1995, p. 97).

Main Characteristics of the Three Participant²⁷ Communities

As stated in the preceding chapters, poverty and depletion of natural resources are the Salvadoran population’s biggest problems and most people make their living through micro-businesses. This is also the situation in the three participant communities.

San José Cortez is located in the periphery of the municipality of Ciudad Delgado, northeast of the capital city of San Salvador. It represents a mixture of rural and urban characteristics, as follows:

- There are no paved and organized roads
- There are no organized addresses
- There are no public phones
- Few families have a private phone
- Most houses have large front and back yards

²⁷ I use the term “participant communities” instead of the term “communities investigated” because “participant communities” is an EPAR concept explained in Chapter Four.

- Most houses have power, but only a few have running water
- Most houses have rustic outhouses without running water

Mireya II is located in the municipality of Mejicanos, southeast of San Salvador. It presents only urban characteristics:

- There are organized paved roads and addresses
- There are public phones
- Most families have a private phone
- Most houses have a small front and back yard
- All houses have power, running water, and washrooms with running water

El Limón is situated northeast of San Salvador, close to San José Cortez. It belongs to the Municipality of Soyapango. It includes several neighbourhoods. Most of them have characteristics similar to those of San José Cortez and the remainder have characteristics similar to those of Mireya II.

In summary, all three communities share problems like,

- High population density, especially of children and youth
- Lack of economic resources
- Lack of domestic running water
- Limited recreational options
- Limited trade training.
- Women practice agriculture as a way to produce food and crops, which they also process to produce medicines and cosmetics to sell.

Direct Research Participants

Nine families -three per community- for a total of 74 people (see Table 5.1) participated directly in the research. However, only the 1 - 3 adults per family, mentioned in Tables 5.2 - 5.4, provided verbal information through interviews, meetings, and workshops. The other family members preferred to be observed or addressed when I was hanging out with them during daily home or community activities.

Table 5.1 Gender Distribution of Direct Research/Development Participants

Age in years	Mireya II		San José Cortez		El Limón		Totals by gender		Total
	F	M	F	M	F	M	F	M	
< 10	1	1	6	1	2	4	9	6	15
11 - 20	3	0	4	4	4	3	11	7	18
21 - 30	3	1	2	4	2	2	7	7	14
31 - 40	0	0	5	1	1	1	6	2	8
41 - 50	1	1	2	3	1	1	6	5	11
51 - 60	0	1	1	0	0	0	1	1	2
61 - 70	2	0	2	1	0	0	4	1	5
71> 74)	0	1	0	0	0	0	0	1	1
Totals	10	5	22	14	8	11	44	30	74
F = female M = male									

The main characteristics of the direct research participants and their gardens are presented in Tables 5.2 - 5.4. In San Jose Cortez, the three families own 400 m², 500 m² and 1000 m² land respectively, and cultivate, among the three of them, 56 varieties of plants²⁸ and have managed to conserve soil fertility. The three families belong to the *Asociación de Desarrollo Integral con Productos Naturales* (ADIPRON)²⁹ /Association for Holistic Development of Natural Products. This NGO and Balsam are helping them to expand their micro-business activities to improve their nutrition and their economic condition. Tránsito and Ricardo are board members of ADIPRON and Santos has lent some land to ADIPRON to

²⁸ Some varieties are cultivated by two or all of them

establish a community-training centre. They all are community leaders in some way, as they help other community members meet their needs. They also have extensive agricultural experience and have managed to maintain plant diversity and soil fertility. These were the main reasons each was chosen to participate in this research.

Table 5.2 San Jose Cortez Community

Names	Age	Family size	# of years farming	# of years farming in the city	Land dimension	# of plants cultivated	Other participants from each family	
							Name	Age
Tránsito Hernandez de Vasquez	70	15	59	20	500 m ²	45	Ana Esperanza Erika del Carmen	35 12
Ricardo Cortez Rosales	55	9	15	20	1000 m ²	28		
Santos Rivas v. de Lopez	66	9	32	20	400m ²	13		

Table 5.3 El Limon Community

Names	Age	Family size	# of years farming	# of years farming in the city	Land dimension	# of plants cultivated	Other participants from each family	
							Name	Age
Rosa Emérita Martinez Gomez	33	7	20	12	133 m ²	42	Duban Villalobos Marvin Rodolfo	50 13
Virginia Carbajal Mendez	48	7	22	12	20 m ²	23		
Nidia Aracely Rivera	35	4	33	33	400 m ²	53		

²⁹ A local NGO that supports micro-businesses concerned with natural products or based on plant processing.

Table 5.4 Mireya II Community

Names	Age	Family size	# of years farming	# of years farming in the city	Land dimension	# of plants cultivated	Other participants from each family	
							Name	Age
Juanita Lovato Galvez de Barrientos	55	8	42	11	24 m ²	27	Felipa Lovato Juan Lovato	
Miguel Hernandez	74	2	69	45	1250 m ²	86	Maria Ana Barahona de Hernandez (known by Etelvina)	70
Laureana de Jesus Torres	60	3	50	20	18 m ²	17	Laura Elena Torres	23

In El Limon, the three families own only 20 m², 133 m² and 400 m² land respectively. There is a big disparity between those who have more and those who have less land, but they all are willing to make changes to improve their life conditions and help others to do the same. Together the three of them cultivate 71 varieties of plants and have also managed to conserve soil fertility through the years. The three families, as members of the Balsam Micro-entrepreneur Network³⁰, are searching for micro-business innovation to increase their income and improve their nutrition. Their successful experience in maintaining diversity of plants and soil fertility and their availability to help others achieve the same, were the main reasons each chosen to participate in this research.

In Mireya II, the disparity in land ownership among the three families is evident. They own 18m², 24m² and 1250m² land respectively. Their soil has remained fertile for years, making them able to cultivate, in total, 83 varieties of plants. Juanita has strong leadership skills. She encouraged the other two to participate in the research. They were reluctant to do so due to past

³⁰ Organization of micro-entrepreneurs supported by Balsam, whose members support each other to develop microbusinesses, including capacity building and fundraising.

experiences in which they had felt used by researchers. These three micro-entrepreneurs do not belong to a community organisation, but they are natural leaders as they share what they have and know with neighbours. They were chosen to participate in the research because they have similar characteristics to the participants from San José Cortez and El Limón, especially their willingness to share.

Indirect Research Participants

Indirect research participants are the people that supported the research by participating from time to time in meetings, workshops, and social gatherings where information was collected and/or analyzed. There were three groups who participated sporadically in the research: Balsam employees and members, ADIPRON Board of Directors, and community leaders that belong to the Balsam Micro-entrepreneur Network, the Urban Agriculture Network and/or communities other than the three chosen for this research (see Table 5.5). These people offered valuable information that complimented and/or validated that offered by the direct research participants.

Synopsis of the Field/Development Work in El Salvador

Understanding El Salvador's Context

I explored internal and external circumstances and opportunities and barriers in the different micro and macro environments in order to understand individual, family, and community strengths and weaknesses in the developmental activities. Document and bibliographic analyses and workshops were the techniques used.

Table 5.5 Indirect Research Participants

Balsam		ADIPRON	Networks		Other Communities	
Members	Staff and volunteers	Board of Director	Micro-entrepreneurs	Urban Agriculture	Name	Community
Alicia	Ing. Cordero	Duban	Rosa María	Xenia	Julian	Arenales*
Nidia	Norma	Nidia		Julia Maria	Petrona	Santa Teresa
Allan	Miguel	Emma		Rosa Maria	Ana Cristina	Emmanuel
Roberto	Rosita	Vicente			Emma	Emmanuel
Mayra	Dolores	Tránsito			Rosa	Mejicanos
	Sandra	Ricardo			Buena-ventura	Zacamil
					Gladys	El Limon
					Federico	Santa Ana
					Miguel	Mireya II

* Arenales was originally chosen as one of the direct participant communities. However, the road to Arenales is isolated and, due to delinquency, is dangerous. I had to change my original plan of having it as one of the 3 main target communities, replacing it with the community of El Limón.

Document and bibliographic analyses were developed in three phases. First, during the first two weeks in El Salvador (June), I reviewed and analysed the Need Assessment and Strategic Plan of Balsam as well as published articles about the national context. Second, I reviewed and analysed the same literature with research participants in two workshops (September 5 and September 25, 2000) developed during the research process. And third, I conducted a second bibliographic and document analysis before leaving the field (September - October 2000), to compare preliminary research findings with what already had been explored.

The information gathered through bibliographic survey and collectively analysed in the two workshops helped research/development participants to understand their own situation and helped me to learn about the economic, social, and environmental context in which these families live. It also led all of us to renegotiate the preliminary research goals, to define the themes of the research, and to achieve consensus about the research process. The two central themes chosen

were: EPAR as a new research/development approach and the success factors in urban agriculture leading to new knowledge for community development.

Investigation, capacity building and action

The process of investigation, capacity building, and action was meant to create the new knowledge mentioned above. It involved three interrelated activities: Building a research community whose main goal is community development, exploring the success factors in urban agriculture that led to community development, and engaging research/development participants in a focused action-reflection-action process relating to the research and development goals of this study.

Building of a local research committee whose goal is community development

Community development is the ultimate goal of the EPAR model. As I was an outsider, I felt the need to create a research team representing the insiders, who are the only ones that would guarantee the use of research findings in their community development. Representatives of the Networks, Balsam, ADIPRON and the nine families from the three communities formed a research team (see figure 5.1), which negotiated the research goals to end up with common goals. Research team members participated in all the decision-making activities that were to lead the research process. The members of the research team were Dubán Villalobos (representative of El Limon and San Jose Cortez communities and ADIPRON), Juanita Lovato Gálvez de Barrientos (representative of Mireya II community and the Urban Agriculture Network), and Rosa María Henríquez (representative of Balsam).

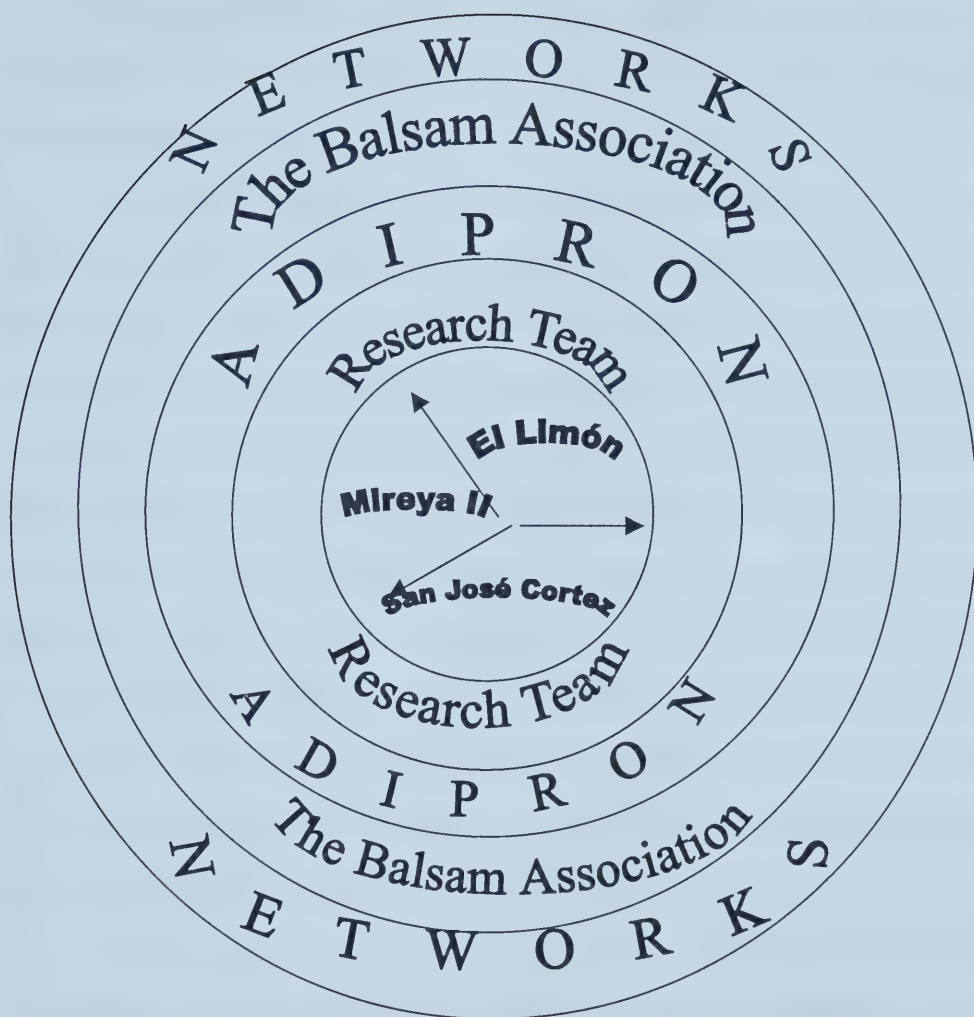


Figure 5.1

Organizational structure of the research team

It was also decided that all direct or indirect research/development participants were free to participate in any meeting or collective activity they could. As a team or as individuals, these people advised me on other matters related to my work, such as entrance to communities and choosing a residence.

Prior to the formation of this team, during the first two weeks of July, while doing participant observation and *pasantias*, I studied the perception that research/development participants have about the organizations/institutions involved in this research. The Urban Agriculture Network is perceived as the umbrella, which involves some micro-entrepreneurs, urban farmers and Balsam staff. Balsam is perceived as the NGO that supports ADIPRON and micro-entrepreneurs from different communities. ADIPRON is perceived as the community-based NGO that includes community leaders from San Jose Cortez and El Limon with the objective of supporting micro-entrepreneurs. All of the nine participants from the three communities felt those institutions represent their interests and helped them to deal with their main concerns. Mireya II was not represented in ADIPRON, but during the research process negotiations for their representation started. The research/development participants from Mireya II participated in training sessions facilitated by ADIPRON.

In this way, the research team and I were the bridge between the Networks, Balsam and ADIPRON and the research participants, linking their interests and negotiating their goals in a mutually satisfactory supportive relationship by consensus. On July 15, I met with the 12 adult direct research/development participants to present my original research/development plan, which included the formation of a research team. The plan was discussed and re-designed by consensus. I proposed a research/development team of 7 elected representatives. The final decision was to have a small group that combined elected and volunteer people. From that moment we met weekly, usually Wednesday, noon at the Balsam meeting place in San Salvador.

The research team was formed in a three steps process. First direct participants from each community elected their representatives (seven in total). Second, some indirect participants (five in total) offered to participate. Third, these twelve people chose from among themselves three representatives as a time saving strategy (decisions by consensus take less time with fewer people). However, as noted above, they left the door open for anyone who had time and willingness to participate. Most of the meetings were with more than three people.

To develop the team, I created and used the team building technique, which included the following:

- Sharing feelings, frustrations, and hopes. Sometimes, they needed to share their problems and I listened to them with empathy. If they were preparing some food, I helped them. If they were talking to the plants, I talked to the plants, too. Those actions took on meaning for me, too.
- Organizing social gathering and tours. Social gathering included celebrating birthdays, anniversaries, and festivities. Tours were arranged to learn from other farming experiences in El Salvador. A tour, for example, was made of the Agriculture School of El Salvador and at Calle Real of Ciudad Delgado municipality; most of these activities were supported by Balsam with guides, transportation, and refreshments. These activities allowed the research team to participate in a continually growing process.

At the end of the fieldwork, the research team members made their plan to continue working with Balsam co-ordinating the follow up activities and designing new research/development initiatives.

The information gathered at each research committee meeting was analysed and selected for using in this thesis and/or in developmental activities. During the meetings, each participant expressed his/her feelings about the research/development process. To help each other meet their needs was central. Through communication each one learned about/from the other, recognising

each one's uniqueness and learning to love each other. This special engagement helped the team to work as a team.

Exploring Success Factors in Urban Agriculture

The documentation of the direct research/development participants' success factors in urban farming was possible using the following techniques:

- Hanging Out
- Participant observation, and
- Interviews

Hanging Out

During the whole research/development process, I hung out once a week in each village, usually this occurred in the evenings or weekends, with direct and indirect participants and their extended family, friends, and other community members that they are connected with. This helped to engage and build trust with them and gain familiarity with their existing interrelations, including gender relationships.

Participant Observation

Participant observation was used in combination with *pasantias* (see below). I started my fieldwork in June, the second month of the wet or rainy season³¹, which allowed me to actively participate in the farming³². I participated in the daily life of the communities, including the

³¹ In El Salvador there are only two seasons: wet season (May to October) that is referred to as winter when it rains, and dry season (November to April) that is referred to as summer when it does not rain.

³² Farming in El Salvador starts in May and ends in September approximately.

action of farming, observing the three families involved. The participant observation process used in conjunction with farming and *pasantías* (see below) occurred as follows:

- First two weeks of July: I interacted with research participants and observed their relationships and interactions with Balsam, ADIPRON, and other community members.
- For 2 months (Middle of July-middle of September): I farmed and observed family member roles in relation to the farming, patterns of activities, patterns of family relationships, time budgeted and expended, and methods of/attitudes when doing farming activities, such as talking to the plants, prayers before planting, weeding, etc.
- During the last 2 weeks of September, I observed:
 - the level of satisfaction or dissatisfaction of participants with the research process and preliminary findings.
 - receptiveness to change
 - level of commitment acquired by each participant and by other farmers within each community and among the three communities investigated.

Observing while farming with research participants allowed me to learn by watching and listening, and by doing.

Interviews

Informal semi-structured and semi-open interviews

A semi-structured interview guide was created by the research committee on September 5, during the workshop organized to learn about the national context. This guide was used to interview the nine research participants and their adult family members (fifteen in total). These interviews were carried out during the last three weeks of my seven weeks of fieldwork (September-October) once my rapport with interviewees was strong. The interviews were carried out in the homes of the families being interviewed. Most of them occurred in the evening. The data gathered using this technique included:

- Female and male activities and individual responsibilities, as well as beliefs and values about agriculture and feelings about their way of life as related to their agricultural practices.
- Land dimensions and diversity of plants cultivated. This included taking pictures of food, medicinal, cosmetic, religious, and ornamental crops, which helped in identifying the plants and documenting their use.
- Type of fertilisers, pesticides, and herbicides used and their environmental consequences.
- Changes in family-life patterns and perception of betterment for both genders.

Recorded Oral History Interviews

During the third week of September, the research/development participants from each community chose a female community leader with a strong background in agriculture to tell me her farming story. These tape-recorded interviews were carried out during the first week of October in the home of each interviewee. I set a time limit of three hours for each interview in advance and established an interview guide. This was discussed and approved by the research team. However, in two cases, I was asked to talk to the interviewee's father to corroborate some information. This involved travel to two other towns, expending a full day in each trip. I travelled to San Juan in Cojutepeque, west of San Salvador and to Santa Ana, south of the capital city. In both cases new information was added. I did not use all of the information recorded. During the open interviews in Spanish, participants freely talked about a variety of ideas. I listened to each tape and chose the information directly related to farming activities and to their current community needs. Before leaving El Salvador, I met with each of the women to present the information selected for my thesis and I received their approval for it to be included.

Action-Reflection-Action

Action-reflection-action was a process designed by the researcher for all participants to analyze the preliminary research findings in order to create new knowledge that they could use in their development activities. The main technique used in this process was *pasantía*.

Pasantías

As I noted above, *pasantias* were used in combination with participant observation. My original plan was to spend a month with each community in two *pasantías* of two weeks (10 days) each. However, research participants preferred to have alternative daily *pasantías* so that I would have the opportunity to visit each community on a weekly basis. Usually the *pasantia* occurred twice a week in each community: Monday and Thursday in San Jose Cortez, Tuesday and Friday in El Limon, and Saturday and Sunday in Mireya II³³. In each daily *pasantía* we met talked, developed workshops, and prepared the conference already mentioned in Chapter One.

Meetings

The first meeting with research/development participants was only with direct research participants on July 5 in San Jose Cortez, July 6 in Mireya II, and July 7 in El Limon. I presented them with my goals as the researcher and they presented their goals as research/development participants. During the first meeting, they accepted my original goal as their own and I accepted theirs as mine. In the following weekly meetings in each community, during one of the two weekly *pasantías*, we negotiated and renegotiated our goals until we designed, by consensus, the goals described in chapter One. Each *pasantía* involved me spending the whole day in each community observing/participating in their activities, sharing information, reflecting/learning from each other, and increasing/creating knowledge. By the end of August, I presented and discussed the preliminary research findings leading the group to

- organize training sessions
- organize and design strategies for them to apply their new knowledge and use the research findings.
- create some project profiles to search for funding

A monthly meeting (first or second Tuesday of the month) in the evening was also developed with indirect research participants to present research discoveries, get feedback, and validate preliminary research findings.

Other meetings were developed with

- city government representatives of each municipality where the communities are located
- a representative of the Ministerio de Medio Ambiente y Recursos Naturales/Environment, the Natural Resources board and two deputies of the National Assembly of El Salvador.
- the NGOs called UNES and APROCSAL
- consultants working with private organizations that deal with environmental problems in Central America.

Phone and e-mail meetings were also conducted with representatives of GI and Grass-Roots Eco-Initiatives of Edmonton.

Representatives of some of these institutions participated in the conference described in Chapter One. Some of them started participating in the Urban Agriculture Network to prepare the follow up phase for this research/development project.

Workshops

A weekly urban agriculture workshop was organized by Balsam to support this research. Every Wednesday from 8 a.m. to 12 noon, between 8 and 14 people from the three communities came to the Balsam meeting place to share their knowledge of urban agriculture and to learn from

³³ The dates were changed according to participants needs.

an agronomist hired by Balsam. During these workshops, Balsam encouraged participants to share their knowledge with other community members and twelve new urban agriculturists from the communities emerged. During these workshops, information was gathered for this research.

Other 2-3 hour weekly workshops were developed in each community during the *pasantías*

- to compare preliminary research findings with current literature on poverty and environmental problems in El Salvador.
- to build new skills in the method used in the research (the EPAR model), urban agriculture, biodiversity, and environment.
- plan new development actions based on the preliminary research findings. The first and the third Wednesday of September were used to brainstorm about how to apply research findings and five project ideas emerged (see Chapter Six).

Urban Agriculture and Biodiversity Conference

At the end of the fieldwork, before returning to Canada, I re-read and re-analysed all the information and prepared a preliminary report, a summary of which was presented in the Urban Agriculture and Biodiversity Conference on October 11, 2000 (see Chapter One). Even though this was a day-long activity at the Balsam meeting place, it was organized and planned during the community *pasantías*. Balsam helped to organize and facilitate it, providing a conference place, personnel, equipment, and other amenities.

Empowerment and Change

Empowerment and change are not specific actions, but a process that took place during each of the other concrete activities. Empowerment and change were gained in two ways: 1) during the interrelation process among the institutions involved, and 2) during the evaluation

process that occurred during meetings, workshops and during the Urban Agriculture and Biodiversity Conference.

During the research/development process, I strengthened the relationships among Balsam and the Urban Agriculture Network as well as with GI and Grass-Roots Eco-Initiatives, using e-mail, telephone, meetings, and workshops. I also initiated a relationship with ADIPRON. All institutions and community groups increased their interest in supporting the BOB project, including this research, with the exception of the GI, which, due to internal changes, was considering project involvement in other countries not El Salvador. This change in direction at GI required that I search for new Canadian NGOs to support the BOB project. I contacted Change for Children and SOMBRILLA³⁴. Both institutions were very keen to support the BOB project. GI decided to continue for one more year and then transfer BOB progressively to Grass-Roots Eco-Initiatives. This decision allowed for continuity in the development aspect of this research.

The action-reflection-action process included an evaluation based on the agenda established for each activity and/or for the research/development process as a whole. The last five minutes of each meeting and the last fifteen minutes of each workshop were left to evaluate the organization, content, and learning of the activity. During this time, each participant disclosed her/his ideas, learning, and emotions, including those related to love, trust, hope, and faith. The process of negotiating goals in these meetings led to the definition of new partnerships and new ways to relate to the institutions involved in the bilateral network created prior to starting the field/development work. The conference as whole was also an evaluation/validation/valuation instrument. During it, research/development participants started a new connection process. All of them shared their indigenous knowledge, experience, and power with other communities and NGO representatives. They also shared their native food and showed samples of their native

³⁴These two NGOs are based in Edmonton.

plants. During it, community representatives encouraged each other and encouraged NGOs, and private and public sector representatives to express their support for the urban agriculturists.

At the institutional level, personal agendas influenced the negotiation/evaluation process, using the agenda based evaluation model. Factors such as prestige and funding opportunities encouraged institutions to participate and factors like time and the need to commit to participate in the follow up activities were hindrances for them to continue participating. To design a process in which personal and institutional agendas would be respected and in which constant evaluation would be a matter of course, was an important strategy. It facilitated the best way to continue working together. Because the goals of each participant were represented, this ensured commitment to the continuation of the BOB project as a research/development process.

Data Recording and Analysis

Data recording occurred in two steps: 1) recording information in notebooks that was collected directly from information providers through the different techniques used, and 2) transferring information from notebooks to cue cards per theme. I organized the information collected into two main themes: 1) EPAR as a new model for research and development, and 2) success factors in urban agriculture. The former included EPAR effectiveness and applicability to other settings. The latter included cultural and agricultural knowledge, beliefs, philosophy, and family participation in urban farming.

The semi-structured interviews were recorded in a questionnaire guide, the oral history interviews with a tape-reorder, and all the other observations and talking were recorded in hand written notes. After reviewing the information during each research meeting, I destroyed the information that was not approved by the participants to be included in my thesis and I recorded the information approved on cue cards and journals or stored in a special protected file by theme. Every night, I typed up as much information as I could in my personal computer. The recordings were in Spanish, as I did not want to lose the meaning of the information and activities. As I write

the research findings, I translate not only the language, but also the culture of the people involved.

The data analysis had a double dimension, the collective negotiated data understood and interpreted during the fieldwork, and my understanding and interpretation as a researcher, using the concepts chosen in the theoretical framework. The former allowed me to check the “validity of the information while I was still in the field” (Modesto, 1991) and allowed the research participants to plan further actions so they could continue to develop. The latter allowed me to put my research within the academic professional context and integrate EPAR as an approach to combine research and development for supporting innovative community development initiatives that benefit the participants.

Fieldwork Limitations

Combining the practical and academic aspects of the research in El Salvador was not an easy process. It was a stressful and time-consuming process. It demanded strong organizational skills and abilities, and commitment to practice the values of love, trust, hope, and faith. If I had not started the creation, organization, and development of the BOB project in advance, I would not been able to test EPAR as a new approach for combining research and development in only four months of fieldwork. Any participatory process involved a large time commitment and the components of EPAR involve at least a year of field/development work. The fieldwork schedule required me to work up to twelve hours daily for seven days a week with an eight day break in August. Besides the data collection process and support to development activities, I had to deal with insecurity and relationship problems. On the one hand, due to delinquency and gangs, I was advised not to use public transportation to go to one of the villages and not to live in an area where most of the people are poor. For this reason, I had to change my original plan of living very close to each community and had to expend between 1/2 and 5 hours daily in transportation. I also had to change one of the participant communities (see above), whose access using public

transportation was dangerous. And on the other hand, due to the intention of GI to not continue their involvement in BOB, I had to expend some time renegotiating their involvement through e-mail and phone calls.

The increasing number of people that wanted to participate in the fieldwork activities was another concern because the research could not accommodate that many participants. This was resolved when Balsam hired an experienced agricultural engineer to train and advise people in urban agriculture.

Finally, the biggest limitation was the inability on the part of the researcher, due to time constraints to document the paradigms, knowledge, beliefs, strengths, and limitations of the stakeholders: Balsam, GI, Grass-Roots Eco-Initiatives, the Micro-entrepreneur Network, and ADIPRON, as well of the city and national government that participated indirectly in this research. There were some limitations regarding the understanding of the concept of a research/development project as the two incorporate variety, and sometimes, contradictory paradigms. "It may be extremely difficult to articulate agendas and negotiate collaborative approaches without speaking the same conceptual language" (Gibson and Gibson, 1999, p. 14). However, the consensus was that the project was able to address poverty and environmental problems in El Salvador and responded to the need to find collaborative solutions.

How EPAR was used in this Field/Development Work

The data collection process during this field/development work was a combination of primary and secondary investigation. I did a document and bibliographic analysis to learn what had already been investigated and about the economic, social and environmental context in which these families live. Through informal contacts, meetings, and workshops, I communicated with Balsam and ADIPRON's members, community leaders, and research participants. With them, I built trust and interconnectedness, so that we could make collective decisions about the research process, research questions, training workshops, and other matters concerning communities.

The field/development work was unique as it facilitated the creation of a process of research project sustainability. My personal commitment, the formation of the NGO-funders bilateral network, and the BOB project design, allow for economic sustainability, as they will facilitate fundraising and resource sharing. The documentation of the national context and formation of a research committee whose goal is community development allows for management sustainability. The research responded to concrete needs and is led by people truly committed to looking for options to meet those needs. The documentation of factors that helped research participants to sustain cultivation of crops on small plot of land contributes to environment sustainability, as it provides relevant information for soil protection and conservation of plant biodiversity. It also supports economic sustainability, as it indicates that having biodiversity and fertile soil in these plots has economic value. Finally, engaging research participants in a focused action-reflection-action process guarantees social sustainability. While providing data, the process also enabled participants to communicate their knowledge and information and learn and use new knowledge, thus creating innovative initiatives for improving their well being and that of the people who live in similar conditions.

All the fieldwork was a process of action-reflection-action in a trusting environment. My first action was to take stock of the national and local context, the culture of participants, and actions already completed (past experiences) by them. Reflecting on this information, I was able to return to action, together with the research participants and collected new information. Reflecting on those actions and findings I was able to give back new relevant information to participants for building healthy living conditions while at the same time I was able to record information for this thesis. In this way, the fieldwork was accompanied by participatory analysis and documentation, which provided the database to validate EPAR and other research/development findings/results.

Chapter Six: Data Collected/Development Estimated

Introduction

The use of the Ecological Participatory Action Research (EPAR) model facilitated data collection and both the data collection and the research/development process inspired further development actions that began even while the field/development work was still occurring in El Salvador. This chapter presents that information. First, the traditional knowledge (TK) brought from rural to urban settings seen from the perspective of three female participants is presented. Second, three models of urban farming led by women are introduced. Third, the knowledge, philosophies, and beliefs used by research/development participants in urban farming are described. Fourth, the developmental actions inspired during the research process using the new knowledge generated are introduced. Finally, a discussion of how the data collected have influenced further development is presented.

TK from Rural to Urban Farming as seen from the Perspectives of Three Women

Juanita, Tránsito, and Virginia told their stories about how they brought their knowledge, in terms of cultural and agricultural practices and organization of family members around farming, from rural to urban areas. They provided important background information about urban agriculture in El Salvador. Juanita migrated from a rural area to an urban setting in search of new learning opportunities. “I wanted to improve,” she said. Tránsito lives in a formerly rural community that is still in the process of urbanisation. “I did not move to the city, the city is engulfing us,” she said. Virginia was forced by the war to abandon her hometown. She was still longing for her home at the time of the fieldwork. “If it were up to me, I would live there, but my children do not want to move back,” she said.

Juana Lovato de Barrientos in San Juan, her Home Town

Juanita³⁵ has practised agriculture for 42 years: 31 in urban areas and 11 in her rural birth home. She grew up in San Juan, Cojutepeque, capital of Cuzcatlán, west of the Department of San Salvador. She had four sisters and four brothers. Her family owned 20 acres of land and she started farming at the age of 5. Her first duties were irrigation, milking cows, and stopping pets and domestic animals from damaging the plants.

The diverse nutritional, medicinal, and ornamental ethnic plants, the diverse domestic animals, 20 cattle, and poultry were all considered part of Juanita's family. Juanita only remembers a few things from her early years, but those things have been very influential in her life. Among these memories are her love of picking tomatoes, her fear of caterpillars and her father dealing with them using the natural resources available, her home full of food, and her mother helping her to heal any disease using medicinal plants. As she grew up, her duties increased. At the age of 16, besides farming, she had to help her mother and sisters in preparing food not only for her family of 11, but also for 8 farm workers. From 4:00 to 6:00 a.m. Juanita and her sisters had to make *tortillas*³⁶ to provide breakfast to 19 people, while the other family members cleaned, prepared farming supplies, carried water, fed animals, and did laundry, among other things. After breakfast everyone, except for her mother who stayed home looking after domestic animals, farmed until about 11 a.m.

Juanita's father was the head of the family and farm. He organized and co-ordinated all farming activities according to the phases of the moon. Juanita's mother was in charge of the household and of making sure everyone behaved accordingly and that they performed their duties. Household activities included seed conservation, and preparation of fertilisers and pesticides. The period from 7:00-11:00 a.m. was considered by Juanita as the practical school

³⁵ Juana is called Juanita by all family members and friends.

³⁶ A round flat and thin corn bread.

time, as her father was teaching them about the different plants and farming procedures. At about 11:00 a.m. it was time for her mother to teach. She taught family members household activities, behaviours, and family values and beliefs. The family members received lessons appropriate to their age, gender, and health conditions.

In those years, Juanita was able to eat fresh fruit and at her dinner table she always had milk, meat, cheese, cream, and vegetables, all of which were produced at home. Her family economy was simple. Her mother traded family farm products with other local producers. Juanita's mother always had cheese, *chilipucas*/sierra bean/lima bean³⁷ (*Phaseolus lunatus*) and *camotes*/sweet potatoes (*Ipomoea batatas*) to interchange with their neighbours for *mora*/American black nightshade, apple of Sodom (*Solanum nigrescens*) and *yucca*/casaba (*Manihot esculenta*). Nobody in town suffered from hunger and Juanita loved that life.

According to Juanita, the land was very good. They never used chemicals. The family system was organized in such a way they were continually producing natural fertilisers and pesticides. On a daily basis, they picked up wood that had fallen down from trees and used it to produce ash all day long. Her father made an annual design of the farm. He decided where to plant corn, where to plant rice, beans, sugar cane (planted during the dry season) and oranges, and practised crop rotation. At the end of each harvest or at the beginning of each dry season (November), children helped their father to store organic garbage (garden waste) within each planting area, leaving garbage to rot and cattle free to leave their manure over the land. While moving around, the cattle mixed their own manure with the garbage. A couple of weeks before the rainy season (April), they ploughed the land, mixing the composted garbage and manure with the soil. Then they waited for the first rains. Once the first rains came, they planted their crops.

Each plot was organized in *surcos* (rows). Seeding was organized by row following one of three models: complementary rows, combined rows, or a combination of the two. In the first

³⁷ English name of plants were taken from Chicheley Plowden, (1972), Comhes, (1985), Griffiths, (1994) and It was not found English name for all plant Spanish names.

one, each row included one type of plant. For instance, a row of corn was planted beside a row of onions. In the second one, two types of plants were planted in an alternating fashion in each row. For example, a corn plant was planted, then garlic, then corn again. In the third model, different combined rows were alternated. An example would be a row of corn and onions planted along side a row of corn and garlic.

For Juanita, seeding and *calzar las plantas* (putting soil around the base of each plant) were her favourite activities, specially seeding rice and sugar cane. Her father organized the children so that they would go out and throw the seeds on the row. They learnt the distance from plant to plant, and from row to row. *Aporcar*³⁸ (manual weeding) was the hardest, but it was still a fun activity. Their tools for weeding were the spades, rakes and shovel.

After Juanita moved from her parental home, most of her siblings progressively moved too, looking for better life opportunities. Their town was isolated and did not have formal educational facilities. When the war came, Juanita's younger sister (born after Juanita moved) was killed at the age of 16³⁹. Juanita's parents were left alone and isolated. Their children were afraid to visit them because they would be killed, too.

To make things worse, the town itself was isolated from other towns. Juanita's parents never abandoned their land; on the contrary, they bought land from neighbours who decided to abandon the town. It is not that I had a lot of cash, Juanita's father said. "It is that people sold their land for whatever someone could pay". They were afraid to die. They asked only what they needed to move and Juanita's father felt he was helping people by giving, in return for their land, the only cash he had. "I was advised to leave, but I had a vision," he recalls. "I thought that one day the war would be over and my children would enjoy this land. If I were to die, I wanted to die on my land." Consequently, Juanita's family landholdings increased, farm labour in her hometown decreased, and her father did not have cash. In this context, Juanita's parents learned about the quick effect

³⁸ In Virginia's town, *aporcar* was understood as what for Juanita was *calzar*. See below.

of chemicals and the results of planting hybrid corn seeds and thus decided to try. Juanita's father, who is now in his 70s, is using chemicals to farm. However, he does not see this situation as a negative one

At the beginning, they wanted to use hybrid corn seeds without using chemical fertilisers, but soon they found out that it was not possible. They had to use sulphate to be able to produce big hybrid corn; however, they combined it with ash to deal with pests. They also used *Volaton* or *Tamaron* (herbicides) instead of the traditional manual weeding. As a result, they were able to produce enough corn to eat and to sell part of it to make some cash without much manual labour.

The introduction of new ways of farming corn did not change their traditional beliefs, such as planting and harvesting relative to the phases of the moon (see below). They also continued producing their own seeds, and used chemicals with special care. "Hurricane Mitch almost left us without seeds," Juanita's father commented. "But thank God a few plants survived, and we still have indigenous seeds." Juanita's father believes that the biggest concern in farming is not the use of chemicals, but the way it is used, the quantity people use, and the loss of the traditional agricultural beliefs and values. The soil is alive and needs to be dressed and taken care of. The minimum amount of chemical needs to be used, and it must be added to the correct place. "If you irrigate herbicides irrationally, you will kill not only the bad plants but the good ones, too. You will undress the land", he said. At the time of the research, Juanita's parents were continuing to combine some chemicals with natural fertilisers, but kept most of the manual procedures and traditional beliefs and values. They still possess approximately 20 acres of land with a very rich diversity of plants and animals, a real nest of biological diversity.

³⁹ The family could not bury her body, because if they went to pick the body were it was found, they would very likely be killed, too.

Tránsito Hernández in San José Cortez when this Town was a Rural Area

Tránsito has practised agriculture for 59 years in her hometown, San Jose Cortez, which has evolved from being a rural to being a semi-rural area and it is continually evolving into an urban environment.

Tránsito was the fifth child in the family. She was the middle of four older sisters and five younger brothers. Two sisters and a brother died at an early age, leaving only two elder sisters and three younger brothers. Her father died when she was 12 years old. Being the youngest girl in the family made her stay closer to her mother, who after the death of her husband, assumed all family responsibilities, including and especially the farming.

Tránsito's education was at home and on the farm with no specific schedule. Her day would start as early as 4:00 a.m. and end as late as 10:00 p.m. depending on the farm obligations. Tránsito learned everything she knows about housing and farming from her mother and it was very hard. "One ended one's life by working," she commented. Unlike Juanita's case, at Tránsito's home, her mother was the head of the farm. Her father learned from her mother how to farm. She was able to do things that were usually done by men, such as preparing the oxen, plough, and rows. As a widow, she became the only authority figure in the family. She organized and coordinated all farming activities, also according to the phases of the moon. Furthermore, she was in charge of the household and of making sure the family members did not misbehave. All children started working on the farm at the age of 10 or 11.

Domestic animals, cattle and poultry were a part of Tránsito's childhood. For 18 years, she helped her mother to farm approximately 10 acres of flat land. They hired some labour. She and her mother prepared food for workers, prepared the land, planted, and marketed plant products. The kind of plants that Tránsito currently cultivates in her home were part of her mother's home, but at that time, they also had big plantations of corn (*Zea mays*), of at least five varieties of beans (*Phaseolus vulgaris*), *ajonjolí* (*Sesamum orientale*), pineapple (*Ananas sativus*), oranges, *paterna* (*Inga paterno*), and *pochote* (*Ceiba acuminata*) among others. "At my

age, it is difficult to remember everything,” she apologises, “for sure rice was not cultivated”. They did it once, but the birds ate the harvest. They also processed *pochote*, which is similar to cotton. They sold pillows and materials for people to make pillows. She remembers that when her mother died, all the *pochote* trees dried up.

Throughout all of those years, Tránsito and her mother never used chemicals. Their agricultural system was purely organic and designed according to their resources. Some plots were rich in biological diversity. A variety of plant combinations were cultivated and cared for. However, there were some areas designated for mass production for marketing. These areas were cultivated using rows of the same seeds. Nonetheless, land continued being fertile.

Manure and organic garbage were left on the land for a season and the next season the land was naturally ready. Ploughing helped to combine manure, rotted leaves, fruits and organic mater with ash. The leaves of the *Pochote*, which according to Tránsito, almost extinct now, were excellent fertilisers. Once everything was mixed, the soil was ready to receive the seeds. There was no need to use pesticides as pests and insects were not seen there. Tránsito assures that before the war many of the plagues that exist today were unheard of. Neither cutworms nor slugs were observed. The soil was good. However, the ploughing was done some days before the first rains to leave the soil exposed to the sun for some days. The sun killed the few soil insects and the first rains signalled the beginning of planting. In fact, there was one plague, the *zompopo*, but Tránsito argues that *zompopos* also produce the best fertiliser. The way to make them disappear is using their own dung. The process basically consisted of four activities performed during the dry season: Look for their nest, which is usually located in uncultivated areas. Clean the nest by taking out the dung. Water the dung and put it back into the nest. By doing this, *zompopos* disappear and the dung is later used as fertiliser.

The harder part was weeding, which was done using spades and rakes, but Tránsito still thought it was fun. She contends, “only lazy people do not like to weed.” She loved *aporcar* or

putting soil around the base of the plant⁴⁰ and picking fruit. “You can not imagine how good you feel when plants are sprouting and growing up; they are living things that need you. My grandparents, my mother and I cultivated the same land for 85 years only using what we had in nature. The land never stops producing,” Tránsito reminisces. Seeding also required special care, though it was fun. One needed to know the exact day to plant, and rain was not the only signal. One also had to observe the phases of the moon. It was also necessary to know the exact distance between plants and *surcos*.

Even though Tránsito strongly believes in organic agriculture, she started using chemicals 40 years ago when she got married. Hybrid corn came to her community, and economic hardship began. Tránsito has tried hard to build a good marriage by pleasing and helping her husband. Her husband is a bricklayer and knew very little about farming. She taught him as her mother did with her father. They cultivated corn, rice and *maicillo*/broom corn/millet (*Panicum miliaceum*). Her husband decided to try the new corn seeds: H3 and H5 without using fertilisers, but it did not work. The corn produced was very small. As they wanted to have big corn, they decided to try chemical fertilisers. The following two harvests were good. The corn was a lot bigger than the indigenous corn grown by her mother. However, after two harvests, the corn produced was smaller, the soil deteriorated, and more and more pests started coming. This situation forced them to use chemical pesticides and fertilisers. The whole process has led, according to her to loss of soil fertility and of the indigenous corn.

Economic hardship was the big problem. She inherited no land. Her husband inherited only ½ of acre of hillside land, had a job, and liked to drink. Their house was in poor condition, and they had 5 children to feed. Moreover, their children did not want to farm. To make things worse, Tránsito only knew how to fertilise flat land, not sloped land. They threw leaves and ash on the land, but they were washed off by rain. They needed many labourers to work their land,

⁴⁰ What Juanita called *aporcar* is called *calzar* by Tránsito

but did not have enough money to pay them. These conditions forced them to do two things: sell part of their land to re-build their house and use chemical fertilisers and pesticides. Nonetheless, they have never used herbicides. They continue to weed in their traditional way. “Weeding by hand,” she proudly says, “leaves beautiful soil.”

During the war, Tránsito and her family stayed on their land. Her hometown became a jail. Soldiers asked families not to leave and killed their animals. Without food and surrounded by bombings, few families stayed. Tránsito’s family was totally isolated and one of her sons disappeared. Their land and plants were the only resource they had. They produced their food and their natural medicines in their traditional way.

After the peace accords were signed, her missing son reappeared. He had become one of the new police officers established as part of the agreement. He was living in a new organic agriculture co-op. He was also ready to receive his own land. Tránsito went to live with him for a year. Tránsito was happy during this time because her son’s land was flat. She was able to teach her son all her traditional agricultural knowledge and to learn new things from the co-op. They planted native tomatoes, onion, garlic, *pipian*/ field pumpkin/outlimn pumpkin/autumn squash/vegetoide marrow/zucchini/cougette (*cucurbita pepo*), lettuce, cucumber, and other vegetables. Natural pesticides were produced using tree leaves, such as *chilamate*/tabailau (*Sapium jamaicense*).

Unfortunately, Tránsito’s son was killed a year after the peace accords were signed. She found his body after he went missing for ten days. Suspiciously, nobody knows what happened despite the fact he was a police officer. He died a couple of days before receiving his land from the government. Tránsito was unable to inherit her son’s land and had to return to San José Cortez.

Virginia Carvajal Méndez in El Coyolito

Virginia practised agriculture extensively in rural areas for 14 years, emergency agriculture in rural areas during the war for 8 years, and light urban agriculture for 12 years. She

was born in the Coyolito village, on the skirts of the Chinchontepec volcano of Zacatecoluca, capital of La Paz, west of the department of San Salvador. Virginia was nine years old when she began learning to farm from her father. There were 12 in the family, but only the father and older children farmed. They owned 150 acres of hillside land. Some of that land was forest. She had everything in her home: coffee, oranges, peaches (*prunus persica*), *anona*, *jocotes*, and more. She did not feel she needed anything else. Her mother stayed home taking care of the younger children. In her early youth, Virginia had a common law husband in her neighbourhood, the Coyolito, but their children died. Both, Virginia and her common law husband cultivated their own separate land, but when her father died, they decided to cultivate the inherited land together and market their products. Later on, they separated and she married another man.

As in Juanita's case, Virginia's father was the head of the family and the farm as such. He organized and co-ordinated all farming activities, according to the moon phases. Virginia's mother was in charge of the mental and physical health of family members, which included food preparation, clothing, and home remedies. Both her father and mother taught the children, orally and by practising from 4:00 a.m. to 10:00 p.m., their traditions, values, norms, secrets, and everything about life and farming and about the relationship among all elements in nature. For example, they were taught that pregnant women could not come in to the farm because plants would dry up, womanizing men would make plants get weaker, alcoholic men would kill the plants, etc. Family values were mixed with agricultural practices because human mood impacts the way plants behave. According to Virginia, those values and beliefs helped, and still help, all family members to behave and perform their duties according to family and community expectations. Farming was a full year cycle, but the year was not measured by the modern calendar. They were led by moon phases. To be able to record this information, Virginia made an effort to correlate their agricultural practices to community events such as Holy Week and the beginning or end of rainy seasons.

The first activity was to lay out the garden and prepare the soil, according to each kind of plant. As stated above, in contrast to Transito's case, the land was sloping land. They designated what she called *ademos*, which for Juanita and Tránsito were *surcos* (on flat land). In this case, *ademos* were in the form of escalators. Between each *ademo*, they created *zanjos* or tiny roads to walk on while planting. Each *ademo* was to grow a specific kind of plants. Some *ademos* were designated only to produce seeds. On each *ademo* they formed *carriles* (rows) of plants according to the planting design made by her father.

Planting season started in May. Two days before planting, all family members cleaned the plot, using *huizute* (spade) and *cuma* (hoe). Her father distributed the area that each family member would clean and later on weed. They measured by *varas* (814 cm), and distributed the workload according to each person's age and physical strength. The first one to finish was praised. There were two ways to clean the land. *Peinar* consisted of digging the plant up by the roots, shaking off the dirt, and putting it on a line besides each *surco*. The other way was *tabletear*, which consisted of cutting the weed, but leaving the roots and putting the plant on the line beside each *surco* without shaking it. "Only lazy people *tabletea*," her father used to tell his children.

Besides plants, they also had cattle, poultry, pigs and other domestic animals. They cultivated different kinds of flowers, herbs, vegetables, and all kind of cereals. Corn, and beans were the biggest crops. Sometimes, they needed to de-forest some areas to expand their plots or to provide sufficient sunlight for the vegetables and grains. They did that by cutting trees and burning them. "They were too big to leave them to rot," she explained. They cut the trees some days in advance of the rain season and left them for a while to dry. Once they were almost completely dry, family members and some helpers cut all of them in small pieces and piled the pieces on the *ademos* according to the planting design. Then, they burned each pile. The burning did not last for long as the trees were not totally dry and they were too wide. Besides, family member did not want to get the soil too warm. Only leaves and *chiribiscos* (thin branches) really converted into

ash. After that, all children started to *basuraer*⁴¹. It was really fun to run all over the land and get really black from carbon, Virginia said. They did this to rescue the wood for fuel. The ash was left there to be naturally mixed with the soil and natural fertiliser prepared by the family in advance (see below). Ash was an efficient pesticide and fertiliser, Virginia said. Three days later, the soil was cold and ready to be *espolvoreado* (mixed manually to look like powder), mixed with the fertiliser, and planted.

Poultry manure and cattle manure was put in *sacos* (big hen bags) and left to compost by themselves for approximately two to three months. It was ready by Holy Week (Easter). Three days before planting the corn, the manure was taken out of the *sacos* to prepare the fertiliser. It was spread over a flat piece of land in front of the house. Then, the following process happened:

- *Remojarlo/sock*
- Spread ash over irrigated manure to kill microbes
- Repeat the two actions two times, then soak again and leave to dry.
- When it was dry, it was like powder. It was then ready to be mixed with the soil.

They never used chemicals.

Seeding was organized by *tareas* (plot), which usually were 12 m² in size. Each *tarea* was divided in *ademos*. As in Juanita's case, they also used inter-cropping. Complementary *ademos*, combined *ademos*, and a combination of complementary and combined were chosen depending on their current needs and the needs for future planting season. They needed complimentary plants that nurtured each other and protected from insects to have a good harvest and they needed to maintain soil fertility for their future plant cultivation. An example of plant combination was:

- An *ademo* with radish
- An *ademo* intercropping corns and beans

⁴¹ *Basura* means garbage, *basurear* was to look into the garbage

- An *ademo* with radish
- An *ademo* intercropping corns and beans
- and so on.

To produce seeds, plants were left on the *ademos* (not harvested) to dry on land. Dried plants were taken out by the root. Then, they were turned over so that the seeds fell naturally into the container provided. Native onions were a special case. They cut part of the onion flower before it opens, and the rest of the onion was left to mature for food. The ones left for seeds were not cut in this manner. They were left to open their flower and provide seeds. “These onions lasted forever and did not attract flies as modern onions do. Chemicals make them vulnerable,” Virginia believes.

According to her, native onion seeds can still be found in the *laguneta* (land around a small lake) of Zacatecoluca. In the case of *maicillo*, the bigger *bellota* (the *maicillo* fruit) is cut, gathered, and left to dry until the seeds fall off naturally. Corn seeds have to be removed from the middle of the *mazorca* (the corn fruit) and taken out manually. All seeds were planted in pots to produce several plants. Each plant was transplanted on their designated *ademo*. All family members seeded, according to the time and distance taught to them by their father. Seed onions are left with a tiny stem, then planted in pots and then transplanted. They can also be produced in pots. In the case of the radish-corn-beans plot, the first plant planted was corn, then beans, and finally radish. The latter sprouts after 4 - 5 days of being planted. The process for each plant differs in some ways from others. For example, *ruda* (*Ruta graveolens*) can be planted by seed or by *estaca* (a piece of its branch). It can be seeded at any time of the year. By *estaca*, it is better to plant it the last weeks of October, when soil is still wet, and before the end of the rainy season. “This is the best time for any plant propagated by *estaca* and for flowers. The dry season is good for selling flowers,” Virginia stated.

Harvesting was the most fun of the farming tasks and Virginia learnt techniques to do that, too. Beans are cut with the *cuma*, leaving its roots, which are tangled with the roots of the

corn plant. “If you pull out the beans by its root you destroy the corn plant”, she said. The fruit is picked, but the plant is left on the *ademo* to rot. In the next rainy season, the rotten plants convert into fertilisers and combine with the soil in the rain. They did not need to irrigate or use chemical fertilisers.

During the war, Virginia was practically a single mother of five. The armed forces pursued her looking for her husband. They burned her well-constructed house and killed all the animals in her hometown. She fled to the mountains with other village families and lived as a nomad for about 8 years. Everywhere Virginia and her community people went were cornered by the armed forces. They spent up to 20 days without access to known foods. First, they ate unknown plants, such as tree parasites. “We had to choose between dying from hunger or dying from poison,” she says. “Thank God, none of the plants we ate were poisonous. Other people survived by only eating bananas.”

That experience made Virginia, and other families who were with her, carry with them domestic animals like pigs and dogs, obtained in villages they visited during the day. Virginia also decided to farm anywhere she stayed even if that was for only a day. She planted cucumber, *ayote*, corn, beans, and whatever available seed she had. She also grew her seeds and kept them hidden to plant them when possible. She knew the mountain and the planting season, so when she figured out that the military had left a place where she had planted something, she came back to pick what was left. Soldiers ate her plants, but there was always something left behind. Her children always had something to eat because she knew which plants were edible. She planted and buried some, and at night she went to retrieve them so she could feed her children. Usually, they could not come back to a place for about eight days. She buried corn and un-buried it when possible to feed her children. She remembers one time that she received 10 pounds of black beans to prepare food for her children. Instead of cooking them, she planted them in the high land. They yielded 9 sacks of beans, which she shared with other families.

In all those years, Virginia learnt to live day by day, building a one room house in a day with what was available in each area, and adapting her traditional farming knowledge to farm small flat or sloping plots of land in each place she that stayed. She never knew how long she would stay in one place. She started the process during the day, went to sleep at another place on the mountain, came back the next day to continue, and so on. Sometimes people decided not to go to sleep in the mountain and the next day Virginia would find them dead, their corpses among their dead animals.

She did not want to leave the area because of her love for her land, but finally, when her fifth child was born, she gave up. She was homeless during a rainy season in an unprotected area with her five children. Her youngest daughter was 18 days old when, in the 1980's, some people brought her to a refugee camp in San Salvador. She lived with her five children in a refugee camp for more than five years, where she could not plant. A couple of years before the peace accords were signed, the Catholic Church, which administered the refugee camp, provided her with a plot of land and construction materials to build a one room house. Later on, they added another room where her family could be accommodated⁴².

Three Model of Urban Agriculture

Juanita, Tránsito, and Virginia are typical cases in El Salvador, and through them, urban farming in El Salvador can be understood. The cases presented in this chapter helped to determine the factors that historically have influenced the research participants' creation of their IK. Their histories influence their current practical experiences and provide input for further agricultural development.

⁴² These rooms were destroyed during the earthquakes of January and February 13, 2001.

Juana Lovato de Barrientos in Mireya II

At the time of the fieldwork, Juanita was a 55 year old woman married to Miguel Antonio, 48. They had two children: Miguel Antonio, 26 and Gloria Carmen, 24. Her son Miguel Antonio was married to Rosa Vilma, 20, with whom he had two children, a 2-year-old, Michele, and a 5 1/2-month-old, Miguel Antonio. They all shared the same household. Juanita's sister, María, 36, and María's son, Darwing, 7, also lived in the same household.

The three nuclear families lived together in a three-bedroom house, with one bedroom assigned to each family. They shared a living-dining room kitchen and a bathroom. There was no back yard; the garden is in the front yard, 6 x 4 m in side. The household activities were distributed among all family members. However, each nuclear family mother did most of the household activities. The three families helped each other not only in household activities, but also financially.

Juanita started farming in the city at the age of 24, when she got married, had her children, and continued studying at night until she finished her middle school (grade nine). She and her family have farmed in her front yard, planting trees, such as orange, oregano/scented matgrass/Mexican oregano (*Lippia graveolens*), *granado*/pomegranate (*Punica granatum*) and banana using her traditional farming knowledge.

The first problem she encountered was in keeping domestic animals and plants. On such a small plot of land, it was really difficult. Her rabbits killed her orange trees. According to Juanita, rabbit urine dries tree roots. She opted to get rid of the rabbits. Since then, Juanita has farmed in the city following her parent's ways, but adapting the system to the small plot of land and urban circumstances. Her formal and informal education has been crucial for that adaptation.

With the help of her family, especially her husband and her nephew, Juanita cultivated 27 varieties of plants: four ornamental, 13 nutritional, and 10 medicinal (see Appendix 6.1) in her front yard. Her husband and her married boy would leave for work at 7:00 a.m. and come back at 8:00 p.m. Her husband helped Juanita to prepare traps and moulds, to move plants, to transplant.

Her son spent time with his children observing Juanita's garden while she worked on it, encouraging his children to enjoy the sight. "If I had a bad husband, I would have already left him. To be embittered is bad. God's Glory is lived in this world, not in waiting until the after life. God's spirit is always among us. (Juanita interview, October 4, 2000).

Juanita is not strictly following her parents' steps. By cultivating a smaller variety of plants than her father does, she has been able to avoid chemical fertilisers, pesticides, and herbicides. Manual weeding and organic pest management and fertilisation have been part of their daily household activities.

Farming is different here than in rural areas. Plants are simple⁴³ here. When the hybrid corn was introduced, chemical started to be used. "Here, we never use chemicals. My father does so because he is alone and old. However, he is guided by moon phases. The World Almanac presents all the year's moon phases and he also is led by his own moon observations. I still have my rake and shovel right on hand. If I do not have them, I get desperate ... I need to be in touch with the soil every day", (she said).

For many years, the idea of diversifying her plant production never crossed Juanita's mind because her front yard was very small. It was not until after the peace accords were signed that she had the opportunity to learn new things about the processing of medicinal plants. She had always used medicinal plants, but never processed or commercialized them. The idea of doing so encouraged her to diversify her plant production. In 1995 she started a system of plant production, processing, and commercialisation, involving her family members and neighbours. She learned from the NGOs: APROCSAL, PROCOTES and Balsam, new theories and practices related to agricultural, agro-processing, and micro-business processes, including accounting. She learned how to make and use new organic fertilisers (see Table 6.1 and 6.2), how to measure materials, how to create pest traps in urban farming and how to produce ethnic plant-based medicines and cosmetics.

⁴³ they are not hybrid like the corn

However, at the time the research started, Juanita was depressed and feeling worthless. The collective had failed and she had promised herself not to work with other people besides her family members ever again. Nonetheless, she enjoyed this first research/development meeting and decided to get involved. After two months of working within the research/development process, a new vision emerged. She realised that the failure of the collective was due to human nature, and that a special approach was needed to prevent future failure. She thinks that the approach used for this research/development is appropriate for her goals.

Table 6.1 Bocashi Recipe

Materials	Process:
<ul style="list-style-type: none"> • Rice skin • Poultry poop • Carbon powder • Coffee skin • Melaza (foam from boiling of sugar cane) • Plastic • Thermometer 	<ul style="list-style-type: none"> • Layer the materials in the following order: rice skin, poultry manure, carbon powder, coffee skin and melaza. • Repeat layers until desired amount of fertiliser is obtained. • Mix all the materials and make cone shaped pile. • Cover the pile with plastic to heat up • Measure the temperature in half-hour intervals, by inserting the thermometer in the crater of the volcano. • When the temperature is over 30°C mix all the materials until cool. • Once the materials are cool, make a cone shaped pile again. • Repeat the process for 3 days, but expanding the time between temperature readings. • After 3 days repeat the process every 2 days • At the eighth day, the fertiliser is ready and is of the best quality.

Table 6.2 Other Compost Recipe

Materials	Process:
<ul style="list-style-type: none"> • Grained sugar cane waste • Melaza (Foam of boiling unprocessed sugar cane) • Bamboo leaves (Bambusa arundinacea) • Mango (<i>Mangífera indica</i>) leaves • Banana leaves • Lemon grass (<i>Andropogon citratus</i>) leaves after draining the oil from them • Carbon power 	<ul style="list-style-type: none"> • Mix all the solid materials • Add the liquid materials • Spread all the materials on a solid surface. • Starting from the second day, turn over the materials in the morning and the afternoon for 5 days. After that, turn over the materials once a day. Measure the temperature every second day. It should not be more than 50°C. It will be ready when it becomes a powder.

Tránsito Hernández in San José Cortez when this Town was a Urban Area

Tránsito is an old woman, 70 years at the time of the fieldwork, with six married children. Two of them and their families live with her and her husband. A total of 15 people, 6 adults and 9 children, live in a small house surrounded by a variety of plants. All the houses of the area are small and situated in the middle of a 500 m² plot of land, that is to say, they are surrounded by green area. The land and what is on it, is the only inheritance Tránsito and her husband have for their children. With the help of three granddaughters, Tránsito cultivates 45 varieties of plants: five ornamental, 20 nutritional, and 20 medicinal (see Appendix 6.2). “My children,” Tránsito laments, “do not want to farm anymore.”

For this reason, Tránsito stopped farming for the purpose of marketing seven years ago. Her few moments of happiness come from planting and taking care of her plants. To Tránsito, many of her farming and cultural beliefs are the secrets handed down from her ancestors through generations. She was sad to learn that none of her brothers and sons liked farming. Her daughters like it, but have no time to farm. Her only hopes are three of her grand daughters who are learning from her. She was happy to have the opportunity to pass on her knowledge in the context on this research.

Virginia Carvajal Méndez in El Limón

Virginia is a 48 year-old woman. Her family is made up by her husband Lino, and her five children: three boys (Selso 26, Salvador 22, and Oscar 14) and two girls (Ana Estela 24 and Janeth 16). It also includes Ana Patricia 17, who is married to her oldest son, and three grand children: Leonel 2 and Estela 4 from her married son, and Noe Alexander, 2 from her oldest daughter who is single. They all live in a two-room shelter built on a sloping plot of land⁴⁴. Three

⁴⁴ This house was destroyed by the earthquake of January 14, 2001, leaving Virginia and her family homeless.

nuclear families share an open space with a damaged roof for kitchen, living and dining room. It is also a workplace as they produce food for sale.

They share a front and side yard, which is approximately 5 x 2 m. each. Virginia cultivates 23 varieties of plants: three ornamental, 10 nutritional, and 10 medicinal (see Appendix 6.3) helped by her family, especially her daughters. Her common law husband and her sons leave for work very early in the morning and return late in the evening. Virginia, with the help of her children, makes her living by producing and selling ethnic food. The three families help each other not only in household activities, but also in meeting nutritional and financial needs.

Despite her small plot of land, Virginia has cultivated a variety of plants. Her beliefs, customs, and knowledge still remain. Trees are part of her family. Farming is according to moon phases. The first plants she cultivated were banana and cashew trees. She prepares protectors to sustain trees in sloping land. She talks to the plants. Her cashew tree was damaged three times, but she nursed it and finally it stayed and grew. When the cashew tree produced its first three fruits, all family members celebrated.

Virginia has confronted many difficulties trying to plant on only a 5 x 2-m sloping plot of land. Children destroy plants when playing soccer. Her Anona (*Annona diversifolia*) tree did not survive the children's games. "I had to change", she said. Here in the city if we do not have cash we do not eat. It is not like home. Everything was produced at home. We did not need cash to survive. We had vegetables, water, fuel, medicines, everything. We did not need to see a doctor. Family business was only planting and transplanting". She has tried to adapt her father's agriculture system to her plot of land, using sticks to prepare tiny *ademos* inside her yard. Her yard is not well fenced and any passer by may pluck the fruits. She applies her beliefs by planting without knowing who will enjoy the fruits. She plants to produce part of her family's food and to provide for others who need it. "My hot pepper tree, she said, is for all my neighbours, they just come and ask. If you pick the fruit more will come".

Soil, water, pests, and seeds have been big problems for Virginia. She had to bring good soil from another setting and mix it with her own. She also uses her organic garbage to maintain its fertility. She plants her crops during the rainy season and irrigates plants during the dry season, which is hard because she does not have running water at home. Her children and some helpers fetch water from another neighbourhood. At the time of the fieldwork, she was planning to build a cistern to collect rainwater during the rainy season. “*Gallina ciega* [blind hen] is the worst pest any farmer confronts nowadays,” she said. “*Gallina ciega* eats plant roots. The *armadillo* is its natural predator, but *armadillos* are disappearing and the *gallina ciega* has spread, eating all roots it finds in its way.” To repel the *gallina ciega*, Virginia mixes her soil with salt.

It has been difficult for Virginia to find in her vicinity all the native seeds she would like to plant in her yard. She knows where they are, but has no money to travel to get them. Nonetheless, she prepares hot pepper and papaya living seed banks, putting a lot of love into it. She is able to produce and sell papayas and to provide seeds to those who do not have them. For example, she was sorry that in a new housing development close by, the developer cut down all the trees, so, she brought some baby papaya trees for owners to plant and all the people were grateful. Virginia’s dream is to go back to her land to be a full time organic farmer. “Your visit has rekindled our will to plant”, Virginia said.

Knowledge, Philosophies, and Beliefs Applied in Urban Farming

According to Barrera & Minero (1995), during the Mayan era, *campesinos* (peasants) knew when to plant following a Mayan calendar. At that time, *campesinos* depended on astronomer priests to know when to wait for the rainy season. Mayans were very superstitious, and lived in fear that the world would end, which made them take extra precautions to assure the sustainability of their ventures. Astrology was important.

The Mayan people related each moment to the position of the planets, which, for them, were gods to be pleased. The Maya also believed in cyclical time; the same phenomena and their consequences were believed to repeat themselves over time.

The Aztecs, according to Barrera & Ayala (1995) had a solar calendar that comprised 360 days divided into eighteen months of twenty nine days each, plus an additional five days, the *nemontemi*, which were considered empty days. All agricultural towns used this calendar. For ritual purposes, however, the Aztecs had a special calendar called *tonapohualli*, which comprised 260 days. Aztec priest had to calculate the exact moment of interaction of each god (planet) and the times to perform their different activities.

Both the Maya and Aztec calendars showed the interrelations of all the elements of nature and when each action or event should happen. Natives were afraid of the end of the planet and so developed the most exact calendar possible for managing natural resources. In order to preserve the planet, people had to ensure that the gods' needs were met. Some of that knowledge, and those beliefs, and perspectives still inform the practices of small urban farmers today.

Agricultural Practices and Cosmology

The nine participant families in this research believe that each moment of their life is related to the planets and that each plant has characteristics that can be measured by the phases of the moon. They believe that all elements of nature are intrinsically connected and that plant cycles are similar to human cycles. Hence, research participants believe that just as pregnancy follows a cycle measurable by the phases of the moon, each plant has its own development cycle, which is also measured by the phases of the moon. Sowing, weeding, and harvesting according to the phase of the moon is a widespread practice. However, Salvadorans have their own way to follow the phases of the moon (see Table 6.1).

Table 6.1: Phases of the Moon

1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Waxing Crescent				Quarter or 1 st quarter	Crescent		Waxing gibbous			Full	
15	16	17	18	19	20	21	22	23	24	25	26	27	28
		Waning gibbous				Quarter or last quarter	waning		Waning crescent			New	

#s refer to the moon calendar, eg: 1 refers to first day, 2 to the second day, etc. (Unknow, ny, np)

The general rules in agriculture for research participants are: Food plants like corn and beans are sown between the waxing crescent⁴⁵ and the first quarter of the moon. Some vegetables like pepper and *cuchinito* (*Rytidostylis carthaginensis*⁴⁶) are sown in the waning gibbous⁴⁷. They never plant corn during the full moon⁴⁸. Weeding is done during waning gibbous and harvest during waning gibbous. All research participants use their modern calendar to plan and develop their daily activities within their society: shopping, going to school, church, and work. However, for pregnancy and the plant breeding cycle, they use the moon calendar, which, according to research/development participants, they keep in their heads.

The concept of time is perceived differently when the people are dealing with life, including pregnancy and plant breeding. Time is not measured by days and hours, but by periods related to the moon. Humans and plants are perceived of as being similar and having similar needs.

Research/development participants also have a holistic perception of nature, and to them, the surrounding environment is the result of the human relationship with nature (Equipo Maíz,

⁴⁵ "The Moon is increasing its amount of light. After the new moon, the first Waxing Crescent appears as a small sliver, illuminated on the right side". (Unknown, n.y., n.p.)

⁴⁶ Scientific plant names are taken from Guzman (1952), PRODERE (1992), Saavedra and Hoogerheide (1993), Lagos (1999), and Strategia Nacional (2000).

⁴⁷ "Since waning means decreasing and gibbous means lopsided or humped, the moon, literally translated at least, looks like a lopsided decreasing sphere. Most of the moon is still illuminated, but a little bit on the right side is out of the way of sunlight, and, therefore, dark. It has now completed 180 degrees around the earth and is on the home stretch" (Unknown, n.y., n.p.)

2000). However, scientific advancements have made them understand those relationships beyond the scope of astrology and astronomy. They now have acquired new knowledge about other sciences and disciplines. For the research participants, the environment is a holistic integrated web that integrates biology, economics, politics, gender relations, and culture as they are all interconnected in daily farming activities.

The research/development participants do not separate out any of the individual components of that whole. The families treat plants as living things that need to be talked to, showered with water, and cared for. Their activities relate to economics in that they process plants to produce food, medicines, and cosmetics for their own consumption or for sale, and by taking the local market conditions into consideration when making decisions. They relate to politics in that they participate in public forums to lobby the government for policy changes, for instance, to stop the destruction of the natural resources or to protest against the high prices of agricultural inputs. Men and women share responsibilities at home and help each other in the production, processing, and commercialization of agricultural products. They conserve a variety of traditional beliefs and secrets⁴⁸ related to the cultivation of a variety of plants in their small gardens and their way of life. Their planting procedures, fertilisers, herbicides, and pesticides are integral parts of that environment.

Before the conquerors came to El Salvador, agriculture was used to produce food, fibres for textiles, equipment to meet the needs of the local communities, using stones and clay, and tools made from stone and wood. Using those equipment and tools, community members developed irrigation systems using water from rivers. They prepared soil by manually weeding and burning. Spain introduced cattle and iron and the use of oxen and plough (Equipo Maiz, 1995). Throughout the years, other techniques from other cultures were added. Today's urban

⁴⁸ It "occurs when the moon is behind the earth. The sun's rays go right around the earth, illuminating the whole moon. The entire face of the moon is lit up; this is the most amount of moon that we ever see". (Unknow, ny, np)

⁴⁹ Beliefs that are considered superstitions by most people yet have value for them.

agricultural practices are the results of traditional and modern techniques as well as of their beliefs and perceptions about life and the relationship between humans and plants. For example, participants mix sulphate and ash to fertilize plants, use soap, pepper and garlic to control pests, and practice crop rotation “when the plant does not like where it is... if you do not move the plant, they say, it will not produce what you expect”. They practice companion planting because plants protect and help each other. Some plants protect other plants against disease/pests, hence corn-onion-corn, corn-garlic-corn or corn-tobacco-corn. Some plants help other plants with nutrients: corn-bean-corn.

Some of the research/development participants have never used chemical fertilizers. Some use them but not exclusively, even though they have been encouraged to do so and sometimes have been mocked when they combine chemical and non-chemical fertilizers. They continue to do what they think is best. They believe that the soil is alive and has limits, just as human beings have limits, and that it must be respected, dressed (with plants) and cared for. According to research participants, the best way to conserve soil fertility is through complementary plant grouping, crop rotation, and the use of manure, mulch, and compost. Putting together plants that produce abundant leaves with others that do not helps to fertilize land, for example: corn-cucumber-pipian (*Cucurbita pepo*), and corn-beans-chilipuca (*Phaseolus lunatus*). The key point, according to them, is to let the leaves rot on the land. Any kind of beans, zucchini, or cucumber produces abundant leaves. Another way to conserve soil fertility is to combat pests manually, using hand tools as well as using madrecaao (*Gliricidia sepium*) leaves as pesticide, mulch, and compost.

To combat weeds and plants diseases, research participants combine chemical pesticides with traditional approaches. They emphasized that most of their ancestors never used pesticides, and if some of their parents do now, it is because of their lack of human resources to look after their rural farms. Nonetheless, they try hard to follow their native ways. A way to protect seeds from insects is to store them in a place above the kitchen where the warmth and smoke from the

stove repels them. The family system integrates not only people, but also their plants and domestic animals, such as pigs, dogs, rabbits, and birds. Rabbits and birds eat insects; meanwhile, children look after those animals to prevent them from eating or ruining the plants. The close relationship among all of them makes them stronger. They help one another survive.

Cultural Practices

Agricultural practices (described above), family organization around farming (described below), and cultural practices are an integral part of the culture and environment of the research participant. The distinctions are heuristic, for the purpose of ordering the research findings.

- Some of their cultural practices are related to their **religious paradigm** that mixes Christianity with indigenous objects/customs, such as prayers, processions, benedictions, crosses made from native plants, and blessed water. The relation with the church/priest/pastor is very strong, probably as strong as was the relation of their ancestors to the astronomer priests. However, what is stronger and common among them is their **religious paradigm** (the understanding of the cosmos under their religious vision). They see the earth and its resources as gifts from God that must be shared with others. This contrasts with the mercantilist mentality in which the earth and its resources are a wealth (or commodity) that must be exploited (Equipo Maiz, 2000) and its fruits as goods to be bought and sold.
- Other cultural practices are related to their **understanding of plants as part of the family**. For example, they believe that plants need to be talked to, that they have tastes or preferences, and that they respond to the way they are treated.
- Some cultural practices are related to their own **values** and the **interdependence** between human and plants. Respect for private property is shown in their belief that only the owner can pick fruit because the plants recognize him/her. “If other people pick [they say] the plant will not continue producing fruit”. Their belief that human attitudes influence plants’ attitudes is

shown in the belief that plants need to be scolded verbally or to be punished by putting things on them to make them feel ashamed to prevent them from doing something undesirable.

- Other cultural practices are related to **biological diversity**: plants, poultry, birds, cats, dogs, and pigs are a common combination. The leftovers of one are good for the others. All things at home are useful for everybody and all living things interrelate and support each other.
- Some cultural practices are related to **biodiversity**, food security and health and healing. 210 varieties of plants were identified during the research, sixty four of them are grown and used, in their present form, or processed as food, medicine or cosmetics (see Appendix 6. 1). Some of them are wild plants that are being adapted to survive on small plots of lands. The action of conserving them had ramifications for the farmer. “*Nos sentimos vivos cuando las estamos sembrando*”. We feel alive when we are cultivating them (author’s translation).
- Other cultural practices are related to their **economy and sustainability**. They use all parts of the plants efficiently to feed their families and to generate income. Then, they plant again the plants they have used. For example, some of them use wood for fuel, but try as much as possible not to destroy any tree or plant. They use the ash produced in their fires as pesticide, fertilizer, and even for cooking (for corn) and washing (as bleach). They believe that the success of their sales is related to their planting practices. For example, if pepper is planted when the moon is six days old, the plant will be small, the peppers will be big, and sales will be good.
- Their cultural practices are also related to their concept of governance, which to them means collective decision making for the well being of the group. Regardless of the political party in power, they have their own governance body (community organization with a board of directors) and governance process. Their community board of directors negotiates support for them with NGOs and municipal governments.
- Finally, their cultural practices are included in the **gender relationships** described below.

Organization of Family Members around Farming Activities

Some of the patterns observed in family organization around farming activities include:

- Women prepare the seedlings, including seed storage and care, keep track of planting and production cycles, transplant, and weed. They also look after the family's well being in terms of nutrition and health.
- Men prepare the land, observe the different environments affecting their crops, weed, control plagues, and choose seeds to be used in the next planting season. They also look after the family's well being in terms of income generation.
- Women and men sell the products and select what is needed for family use. They conserve some gender division of labour, but help each other in family activities. The man helps the woman in domestic tasks and the woman helps the man in income generation activities.
- Children watch that animals do not eat the plants. They are trained according to their age, education, commitment, and health conditions.
- All family members participate in sowing, harvesting and marketing.

Education is a permanent informal and practical process usually led by the wife-mother. It is age-specific and systematic. There is a daily work routine in which each of the family members does specific tasks. However, it is flexible taking into consideration each family member's health, mood, and condition. An example, collected during fieldwork, of how families organize their work and educate each other, is illustrated by the following data:

Duban and Rosita have five children at home. Rosita is a micro-entrepreneur who sells food out of her home. Her children are in school and also help Rosita with the sales. Duban is a community worker, who is known as "*el doctor de la comunidad*" [the community doctor⁵⁰]. All family members help in home activities. Usually, they all get up at 4:00 a.m., except the 4 year-old-girl. While Rosita washes the clothes, Duban cooks corn and prepares materials for food production (for family consumption and sale), and the children feed the animals and carry water. They all do

⁵⁰ He is called "el doctor" due to his wide knowledge about medicinal plants.

different things to prepare breakfast, clean the house and take care of the garden. At 7:00 a.m. Duban goes to work. Rosita starts preparing food to sell. Some children go to school (some go in the morning and some in the afternoon, so Rosita always has a helper with her food production and sales). Afternoons and evenings are similar. Besides selling, they take care of the animals and plants. They have 23 ornamental, 15 medicinal, and 8 nutritional plants for a total of 46 varieties of plants on only 23m² of land (front yard is 2 x 4 m and back yard is 5 x 3 m). They also have pigs, poultry, birds, and dogs. In such a small place, crowded with people, animal, and plants, cleanness and happiness was observed, despite economic and some health constraints. It was also odourless, which is uncommon in a house with pigs.

The distribution of household and tasks exemplifies the gender collaboration practised among them. Moreover, those activities were not only about carrying out tasks, but also about the complementary and caring attitude among them and with their extended families, their plants and domestic animals. It was like a complementary system of mutual support, where adults teach children, women teach men, and vice-versa. Duban commented that he has learned about gender issues and has contributed to changing family relationships by participating in community development training where new visions about gender are taught.

There are differences among families. The degree of complementary and mutual support varied depending on the characteristics and special needs of each family member, the family composition, and their access to training. Out of the nine families involved in this research/development project, women headed five. Men in those families were sons or brothers. One family was composed of only women. The biggest issue within the families headed by women was related to economic conditions. A one income home (woman's income only) burdens women and children, causes them more stress and physical problems. Medicinal plants help them a lot, but they still are not enough to deal with mental and physical health problems. In all the nine families, children are educated with a new vision of gender relationships. They are taught that women and men have the same rights, that there is not superiority of one gender over the

other, and that people from both genders have skills and abilities to perform the activities (inside and/or outside their household) they choose to do or need to do to create their well being. To practice those teachings, all children in a family are given family duties. In two research participants' households, the husband/father still rejects some household activities, but encourage his male children to be different. Only in one family did the husband did not perform any household responsibility. The family still consider him a part of them, but he is absent (he comes home only to sleep).

Developmental Actions Inspired

Expansion of BOB Project Using the New Knowledge Generated

Based on information of previous phases, including this research/development phase, Balsam and GI developed, with the assistance of the researcher and research/development participants, a proposal for a year long BOB project to support communities to sustain healthy food production and sustain food supply for the poorest in the country through the development of agricultural micro-business. The plan was to use appropriate technological interventions to train 50 small farmers in five communities of San Salvador. "Participatory approaches seek a more systematic accommodation of indigenous knowledge in research on technological interventions" (Schafer, 1978 in Sillitoe, 1998, p. 225).

The use of diverse food, industrial, religious, herbs, and ornamental plants will facilitate the protection of biodiversity, rescuing plants in danger of becoming extinct. The use of organic fertilisers, pesticides, and herbicides, will help to meet waste problems, also reducing environmental contamination, and facilitating soil reclamation and conservation. The Canadian International Development Agency (CIDA), the World Relief Lutheran (WRL), the October Hill Foundation and the Wild Rose Foundation have already funded this project. In a phone call from Balsam on July 16, 2001, I was told, "your dream came true, and your contribution to El Salvador was publicly recognized during the training session". Three Canadian professionals joined several

Salvadoran professionals in El Salvador to facilitate theoretical and practical training on July 6-20, 2001, as part of the BOB project, which also is combining research and development. A Canadian and a Salvadoran professional presented EPAR as a model to continue developing the BOB project, acknowledging my authorship of the EPAR model.

Living seed banks micro-business

According to research participants, the best way to keep seeds alive is by using them. An elder and a young woman from each of the research communities will set up a micro-business to produce and sell ethnic seeds to community members so that they are able to grow food, medicinal, and other uses plants. In this way, the elders will transfer their knowledge to the youth.

Production, use and capacity building of/about ethnic food plants

Research participants believe that biodiversity of plants can be preserved if people use them to meet their needs and tastes. Research/development participants used two research findings to design this plan: the need for nutritional food and the presence of nutritional plants cultivated by research participants. Most of the community members ignore the nutritional value of their plants and the different ways they can be prepared to taste good. In this way, they planned to share their knowledge following these steps:

- Teach people how delicious ethnic food is.
- Once people like the food, they will wish to learn, so they will then teach each other how to cook it.
- When people want to have the resources to produce the food, they will teach themselves how to cultivate the plants organically in their yards.

The project therefore included:

- A collective kitchen in each of the three participant communities, as a tool for training.

- Training to teach how delicious indigenous food can be, how to cook it, and how to plant food crops.

They will encourage children to participate and teach them that ethnic plants taste good and are nutritional.

Rain-water for domestic use and gardening

Water is a big limitation for gardening, especially for families who do not have running water at home. Each community planned to design a water reservoir and rainwater distribution system, and train community members to treat, manage, and conserve rain water while preserving its quality.

Research into the Nutrition of Ethnic plants

Research participants' knowledge about plant uses is highly recognized and appreciated by their communities, NGOs, and people in general. However, there is a concern about the nutritional content of some ethnic plants. They would like to know, for example, the amount of potassium or iron that certain plants contain and what plant combinations should be used to obtain a complete protein. A plan was made to research the chemical composition of ethnic plants and to teach people about their nutritional value and about how to combine them to obtain the nutrients needed for good health.

Discussion of how the Data Influenced the Development

Throughout the generations, traditional agricultural and cultural knowledge have been handed down from parents to children. In the process, the knowledge has been adapted to each unique natural environment by farmers, creating their own IK. This adaptation is not isolated

from social, cultural, and economic environments of the people and country. In fact, as shown in the present chapter, urban agriculture is a result of the history of the people and their country.

Three women, three life histories, and three ways of life, but all of them interconnected with common issues, common understanding of nature, and common innovative solutions, show the way farming knowledge has been used and translated from rural to urban areas. Juanita, Tránsito, and Virginia are living examples of what it means to be “agents, actors, creators of culture, and participants in the making of history” (Withers & Thorne, 1993, p. 593). They had to go through a variety of changes, adapting and innovating wherever they have been. Their experiences show not only their stories, but also some “indigenous indicators [for farmers] to determine favourable times to prepare, plant, and harvest gardens; land-preparation practices, ...seed storage and processing; ...indigenous methods of sowing; seedling preparation and care; farming and cropping systems; ...pest-management systems and plant-protection methods” (Grenier, 1998, p. 3), as well as methods for soil and plant protection and pest management, seed storage, and cropping systems. Their practices relate to their understanding of the planet and the role of people on it. For them, the sun, the moon, the plants, and all the elements of nature are interconnected and need and help each other. This philosophy has been crucial for them to survive the hard social, economic, and political circumstances in which they have lived.

As noted in Chapter Two, hard economic conditions led to a civil war. The war and the hard economic conditions led to urban migration. The war, the hard economic conditions and urban migration have led to the loss of interest in agriculture, which in turn impacts the well being of people and the environment due to the lack of food production and the deterioration of the natural resources. In the three cases presented, there was more than that. Life was in jeopardy and some lives were lost. It is safe to say, that all of those elements have historically influenced the changes not only in Juanita's, Tránsito's, and Virginia's families, but also in all Salvadoran families.

Research participants' farming philosophy and procedures have been enriched and improved by adapting them to urban settings. That philosophy and those procedures comprise their current indigenous knowledge and their practices for community development. Now, they understand that their predecessors' ancestral knowledge and perceptions about plants and farming were part of a philosophy that met community and social expectations. They also realise that most of that knowledge was related to the holistic understanding of nature and their native vision of sustainability. This understanding and vision are important in their micro-entrepreneurial work. The histories of these three women have influenced their ways of life and provided input for any innovative community development initiative.

The research findings show that the nine urban farming families that participated in the research/development process have succeeded in urban farming by using their IK to produce food, and crops for cosmetic, and medicinal purposes, while protecting soil and the biodiversity of plants. For research/development participants, indigenous knowledge, biodiversity, culture, and community development interact and are interdependent systems, where their participation in farming and their knowledge about medicinal and nutritional plants are essential. They produce and use organic fertilizers, pesticides and herbicides, using their home and garden waste, plants, soaps, and home wares, among others, to cultivate and process food and natural medicinal plants. They see an intrinsic interrelation between humans and plants. Both understand each other. Both are living things. They act as if human attitudes influence plants attitudes. They believe that as living things, plants and animals must be respected and talked to. They also see an intrinsic connection among the sun, the moon, people, soil, animals, and plants.

Traditional knowledge has been handed down in their daily activities through generations in the form of secrets or religious beliefs, giving a sense of mysticism. Those traditions have been combined with new farming knowledge and new perceptions about gender and family relationships and well being, according to their daily needs, roles and responsibilities at home, in their garden, and within their communities. The combination of all is the IK used in their urban

farming and a key element to success. It is the use of this knowledge that made it possible for research participants to conserve soil fertility and biodiversity of plants in their small yards, thus their knowledge is important for their sustainable development activities.

The use of the EPAR model allowed research/development participants to apply the new knowledge generated through the research process in their daily struggle for survival within a hard environmental context as this new knowledge was being generated. During the process, they were re-structuring their ways of life and work using their beliefs and knowledge about families, farming and plant uses and they planned to share their knowledge and experiences with others so that they, too, could achieve the same and all together actively participate in debates on government policy changes to create healthier ecosystems for present and future communities.

Linking biodiversity with micro-business seems to be a good combination for them to create an alternative way of life that will sustain their food production, income generation, and environmental protection. "The seeds born from the germ 'terminator' are sterile. According to some catastrophic scenarios this genetic material could cross with wild relatives and extend itself among the other species to suddenly leave sterile the whole native flora." (Menjivar & Sermeño, 2000, p. 24). They want to avoid this.

Chapter Seven: I K and EPAR as a Research and Development Tools

Introduction

This chapter presents a summary of the traditional knowledge included in the current IK used by research/development participants, the main components of the IK used, the impact of the developmental results, and concludes with a valuation⁵¹ of the effectiveness of the EPAR model.

TK and Beliefs in Current IK of Participants

The results of this research/development project include applied traditional knowledge, beliefs, and perceptions as well as procedures, techniques, and approaches to cultivate food and medicinal crops on small plots of land, conserving soil fertility after repeated use and conserving the biodiversity of plants in urban agriculture. The most common traditional knowledge, beliefs, and perceptions found during the research includes the following:

- Plants are part of the family and as such have adapted to urban settings together with the other family members. Plants can potentially be adapted to new physical environments such as urban areas in El Salvador and Canada. Research/development participants associate farming with the psychological and social well being of their family members.
- Plants are living things and respond to the way they are treated. Crop rotation (plants are shifted) is practised when the plant does not like where it is. Companion planting is done because plants protect and help each other: some plants protect others from disease and pests. Some plants help other plants by providing nutrients.
- Surrounding environments provide the resources needed to farm. Burying organic waste helps to keep the house clean, conserve soil fertility and keep diverse plants alive. Soil is prepared using homemade (combined chemical with ash or plant parts) natural fertilizers,

⁵¹ The work valuation instead of evaluation was chosen as a way to emphasize the positive aspects of this research. The researcher acknowledges the importance of recognizing negative aspects, but believes that positive views of people and their actions are the engine for the construction of a better world for all.

pesticides and herbicides, and manual removal of weeds. In other words, they believe that plants are part of their life and serve as resources for their survival.

- Soil is alive and has limits just as human beings have limits. Thus, it must be respected, dressed (with plants) and cared for.
- Each moment of people's and plants' lives is perceived as related to the cosmos. All elements of nature are intrinsically connected. Each plant cycle is similar to each human cycle. Just as each woman's pregnancy follows a cycle measurable by the moon's phases, each plant has its own development cycle, which is also measured by the moon phases.
- Farming is related to the moon phases: food plants are sown between the waxing crescent and the first quarter of the moon. Some vegetables are sown in the waning gibbous. Corn is never planted during full moon. Weeding is done during the waning crescent or waxing gibbous, depending on the kind of plant. Harvest is done during the waning gibbous.
- Transmission of traditions, beliefs, and perceptions to younger generations is done in two ways: theory and practice. Theory is taught by the sharing of secrets and under the umbrella of religious beliefs. Practice is taught by doing.

Components of the Indigenous Knowledge Used

During the research/development process, it was found that the use of indigenous knowledge (IK) by the nine participating families was the key element for them to succeeding in urban farming. Four elements of this IK have been crucial for them: their ability to adapt their traditional agricultural and cultural knowledge to urban settings; the ability to integrate new knowledge with their traditional knowledge thus creating their own indigenous knowledge; their religious paradigm; and their understanding of diversity.

Ability to adapt traditional cultural and agricultural knowledge to urban settings

Economic and environmental factors compelled research/development participants to look for new food production and income generation alternatives. While those same factors remained as obstacles to the urban agriculture ventures, the participants have been successful in overcoming them. Juanita, Tránsito, and Virginia's life stories presented in Chapter Six, show how the social, political, and economic hardships made them creative, and how their traditions, beliefs, and perceptions helped them to cultivate a variety of crops wherever they were to produce their food and to prepare their home remedies. Plants are part of the family, and as such have adapted to urban settings together with the other family members. When living in rural areas, research/development participants looked to their own environments for the resources needed to farm. In urban settings, they have done the same. Their ability to adapt their traditional agricultural and cultural knowledge to urban settings is evident.

Integration of Traditional and new Knowledge: Creating Indigenous Knowledge

IK within the context of the participant families involves both the classification of plants and indigenous understanding of nature, including human nature and gender relationships.

Traditional ecological knowledge is usually presented by anthropologists and others in one of two forms (sometimes both): folk taxonomies (the ethnobotanical and ethnozoological classifications of plants and animals), and as indigenous understandings of 'natural' processes (systems of relationships involving plants, animals and various supernatural and environmental factors). Together these two broad kinds of information have been constructed as constituting traditional ecological knowledge (Lewis 1993, p. 8).

The results of this study show that both elements are presented in research/development participants' lives. They have, in their heads, a classification of plants and have developed an accurate way of understanding nature, including methods for soil and plant protection, pest



management, seed storage, and cropping systems. "The key elements to use new farming products [they said] is to know what, when, where, and how to use them" (see Chapter Six).

When I had arrived in El Salvador, local reports were announcing that the Minister of Agriculture and Livestock had presented the Seed Law bill to the Legislative Assembly. This bill would allow the free circulation of genetically engineered seeds into the country without any restriction. Genetically engineered seeds were already being distributed to farmers. This event presented a challenge for research/development participants, as they are strongly committed to the conservation of native seeds and traditional plants. They realized that their experience and knowledge about cultivating food and medicinal plants must be improved and shared with others as a way to preserve their native plants. It was considered important to make an inventory of the plants they use. This is presented in Appendix 6.4.

The information presented in Chapter Six and the following actions developed by research/development participants expressed their understanding of nature, which is part of their IK:

- Combination of store bought with homemade farming products to avoid damaging people, soil, and plants (ex: combination of sulphate and ash to fertilise plants).
- Appropriate timing for fertilisation and pest control for each plant: where to put it, and especially how.
- Integration of new and traditional gender knowledge and visions, which helps them to create better gender relationships within their families. In comparison to other community members, most of them have built more egalitarian gender relations within their families. Men and women collaborate with each other to fulfill each other's needs. As community leaders, a member of each of these families, six of them women, also have built and maintained a variety of interrelations within and outside their communities while representing them to deal with community issues.

- Perception of the environment as a holistic web that integrates and interconnects biology, religion, economics, politics, gender relations, and culture.
 - Biology: producing 210 varieties of plants and agro-processing 64 for food and medicinal purposes, protecting soil and biodiversity of plants.
 - Religion: Believing that plants are a gift from God and must be shared regardless individual benefits.
 - Economics: developing plant-based microbusinesses
 - Processing, marketing, and selling plant- based products
 - Taking the local market conditions into consideration when making decisions.
 - Politics: participating in public forums⁵² to lobby the government for policy changes, for instance, to stop the destruction of the natural resources or to protest against the high prices of agricultural inputs.
 - Gender relations: Men and women sharing responsibilities at home and helping each other with their micro-business.
 - Culture: increasing their knowledge of nature, awareness of its needs, and improving their skills. Knowledge, awareness, and skills are interconnected as part of their culture. Their agro-ecological procedures are related to their understanding of natural laws that regulate all lives in the cosmos.

Religious Paradigm

The religious paradigm is considered part of the traditional knowledge inherited from Salvadoran native people and was found among research/development participants. They perceive land as a source of life, and success as the ability of each family to live in harmony with nature and to create healthy communities for all. This concept of success is essential for the

⁵² Some majors called for public forums to discuss communities issues.

creation of community development initiatives that benefits all people and preserves natural resources. It contrasts with the predominant contemporary model in which success is defined by the quantity of things each family possesses or consumes or for the status they have within their society.

Understanding of Diversity

There is also a collective understanding of diversity in the research participants' IK framework, which is related to their understanding of different ways of life. They perceive each kind of plant as a unique species with unique characteristics and needs. They understand that there are different ways of life, that people in the North live differently than people in the South and that most people in the South dream to live as people in the North do. However, they also understand that if all countries consumed in the same way and quantities as rich countries do, the planet would not last for long: Seven Earths would be needed (Equipo Maíz, 2000). By understanding diversity, they understand that they need to remain different and help others to use their unique way of life to help to create healthy conditions for all people and nature in each country and in the whole world.

Impact of Development Results

By the time of the field/development work, research/development participants already knew that their traditional agricultural practices protect their natural resources, but never thought that their knowledge was crucial and needed by others to farm in the urban setting to protect and conserve the physical-biological environment. The research/development process helped them to acknowledge it and became very excited to be able to share it with other community members not only in El Salvador but also in Canada. They helped to analyze the new information and create new knowledge about farming and plant uses, which was immediately used by them to design new community initiatives for their own endogenous community development. "*Action* signifies a

process of continual change both in the research process and the situation” (Rothe, unpublished, p. 95). They started contributing to changing their environments for the better.

With Balsam’s help, they organized community workshops in their own homes to teach their neighbours their environmentally friendly urban farming. Some children participated in a Painting Peace program, an activity developed by Change for Children of Edmonton. This was an opportunity for these children to express their unique understanding of their role in urban agriculture and the role of urban agriculture in society⁵³. Research/development participants demanded training and information and evaluation meetings where they were introduced to new knowledge that helped them evaluate their socio-cultural environments and plan concrete future actions. Analyzing the context helped them to design their projects and apply for funding during the field/development work. The research contributed to strengthening those nine families’ capacity to look for options for a better future through the development of micro-businesses for which they will have the support of Balsam, GI and Grass-Roots Eco-Initiatives.

EPAR Effectiveness

EPAR is a result of this research as it was designed specifically for this research context. During the research/development process it was enriched by all of the research/development participants and converted into a tool they could use to pursue their own development. As a result, the research process included not only findings to be written and read, but also concrete actions to be understood and applied to meet the needs of all the participants. Those actions definitely include understanding the context, networking, organisation, capacity building, and empowerment.

⁵³ Twelve Canadian youth came to El Salvador to paint murals showing the need for peace. Even though, it was a youth program, the participant children painted a mural showing that by planting they contribute to urban agriculture and that urban agriculture would contribute to peace as deal with basic needs such as food.

EPAR helped research participants to acknowledge their own identity, develop new capacities, and **empower** themselves to have a true desire and plan to make the **changes** necessary to improving their current living conditions. It allowed research participants to interrelate complementary spiritual and physical actions: increasing awareness, organization, education, research, production, and marketing. It helped them to learn both to use their own knowledge to find solutions to their problems and that international partnerships can facilitate endogenous development. The well being of people intrinsically interconnected with their environments (social, cultural, economic, political, and physical) was enhanced. Keating et al. (1997), in writing about the care for the elderly, point out assumptions that turn clients into partners and actors in the process of their own care. In this research using the EPAR model, clients were the participant families who are trying to develop by becoming partners and actors in their own destiny. Sometimes, the author was the expert, who became the client and vice versa. Each taught the other within the process.

EPAR also helped all of us researcher and research/development participants alike start building a new future based on our respective cultural heritages. EPAR helped us to start building Salvadoran-Canadian partnerships for mutual support and for sharing knowledge and technologies.

Within this process, research/development participants started believing that hard living conditions for all can be changed. They started to gain or recover faith in their own culture, abilities, and capacity to learn new things to make those changes, and they started concrete actions, contributing to changing their environments for the better. They organized community workshops in their own homes to teach their neighbours their environmentally friendly urban farming. They also showed their new understanding exercising their right to speak and be listened to. They talked to neighbours, relatives, schools, and churches, sharing their new knowledge and experience. For them, the application of their unique knowledge in urban agriculture will contribute to creating peace in the world, as it will address poverty, which is the main cause of

violence. Summarizing I can say that the EPAR model helped to validate urban agriculture as a way to

- maintain culture and values
- preserve plants in danger of extinction
- generate healthy food
- preserve natural ecology
- ease the impact of the global market on low-income families

Discussion

The main result of this research is the development of the Ecological Participatory Research (EPAR) model, which in contrast to the prevailing tendencies in IK investigations, helped to combine research and development. “There are two strands to the evolution of the indigenous-knowledge perspective which have remained largely independent, one academic and the other development-focused” (Sillitoe, 1998, p. 224). By combining the EPAR model and the IK found during the fieldwork, it was possible to create new capacities and knowledge for research participants to empower themselves and start a process of community development through the creation of plant-based micro-businesses in which the values of love, trust, hope and faith are important.

In this way, the EPAR model enabled participants to use their IK to work in their community development in a locally manageable, cost-effective, and sustainable way. The empowerment and change accomplished by participants was evident in their urban agriculture and biodiversity. The researcher and research/development participants celebrated their new birth, which is best expressed in the words of Juanita”

When you came to my house, I was dead; I thought that everything was over for me, no hope for my future. Now I feel alive, I know I am able to do many things for myself and for others. I want to work with children; they need to learn about the power of plants for our well being now and later on.

I have already talked to my community school's teachers. They were willing to let me talk to students (Juanita Lovato, Oct. 8, 2000: informal conversation/author's translation).

As Juanita did, all research/development participants expressed they had increased and enriched their understanding of their community's internal and external reality and of their own ability and capacity to transform those realities and create change. In summary, I can say that

- Current social and economic conditions in El Salvador urgently require new community development initiatives for which IK and the EPAR research models are essential.
- Combining both IK and EPAR during a research/development process it may be possible for researchers/developers to facilitate food production, income generation, and environmental protection for families and communities. EPAR provides a tool to organize people and projects, build capacities, and create knowledge. IK supplies a philosophy, and many techniques for understanding the interrelation between humans and nature and the need to share resources for the well being of all.
- Using IK and EPAR together might enable participants to create healthy ecosystems and to sustain their individual, family, and community development by using locally appropriate resources and knowledge.
- In El Salvador at least 74 people (participant families) have increased their understanding of environmental problems and people's role in creating local solutions, the need to use their indigenous knowledge of plants and its uses to sustain their community development, their commitment to produce healthy food and medicinal crops while protecting natural resources, and their awareness about the need to create North-South knowledge and technology transfer.
- Research participants are micro-entrepreneurs and as such they are already using research information to plan new micro entrepreneurial initiatives. In this process, women are playing a leadership role. This was evident in the conference developed before leaving El Salvador where most of the leaders were women.

- At an institutional level, Balsam has increased its ability to use participatory approaches to combine research and development to be able to efficiently support local community development initiatives. They also have increased their ability to engage in national and international partnerships.
- At the national level, Balsam partnered with ADIPRON, and at the international level strengthened its partnership with the GI to continue supporting urban agriculture initiatives.
- During the fieldwork, research participants were connected to the Salvadoran community members in Edmonton, who later encouraged the partnership between Balsam and the Salvadoran Society in Edmonton. Currently, both organizations have partnered to exchange seeds and knowledge in order to develop environmentally friendly urban agriculture in both countries and to support victims (including research participants) of the two earthquakes that occurred in January and February of the current year. New urban agriculture initiatives to include victims of the earthquake have emerged. In all cases, I continue to play a role in advising and building connections.

Chapter Eight: Conclusions and Recommendations

Conclusions

To conserve nature and meet human needs is the greatest challenge of the present era, especially in terms of food production for a growing population. To produce food, big companies are transforming nature. However, humans are unable to create nature and nature has limits and its own laws, which are difficult to know holistically. Any theoretical framework to support research and development to address the needs of humans and the need to preserve nature for future generations must be holistic. EPAR was developed as a human ecological model, as human ecology is holistic in nature.

I did not choose a specific existing model, as I wanted to combine research and development in a unique way. By integrating research and development concepts and assumptions from different paradigms, I was able to analyze, interpret, and document data that can potentially be used to address the needs of humans, as well as the need to preserve natural resources, at an international level. All concepts and assumptions are essential. All of them interact, interrelate, and complement each other, horizontally. The theoretical framework is itself an ecological niche (see Figure 3. 1).

The combination of what already has been investigated (see Chapter One) with the concepts and assumptions chosen for this research (see Chapter Three) helped to understand each family and each community as a distinct human ecosystem (see Figure 3.2) in which women and men relate and develop differently. In each human ecosystem, all environmental components are interdependent. Each human ecosystem uses all the knowledge and information available to transform the natural resources available, adapting to what can not be changed or transforming what can be changed.

One of the most significant aspects of this model is that research participants acted upon their interests while providing information. Three major effects were observed.

- They socialised their knowledge and the way they apply it in their daily agricultural practices.
- They acknowledged that they have strengths and abilities to use their own resources to build a new way of life.
- They committed to improve their practices and to help others within their communities and in other communities to do the same.

The EPAR approach helped them to change and by changing to start working for new ways of life that will benefit all, fairly.

Research/development participants have succeeded in urban farming because they have worked with an agro-ecological perspective, combining chemicals and organic fertilisers, herbicides, and pesticides, and combining complementary plants. Their agro-ecological procedures are related to their agro-ecological understanding of natural laws that regulate all life in the cosmos. Their perception is in line with the professional understanding of agro-ecology “scientific discipline that offers principles for the management and design of farming systems that are socially and culturally sensitive, and economically viable” (Modesto, unpublished). The nine families that participated in this study have adapted their farming practices to use the matter-energy and information available (see Chapter Six) to sustain the production of a variety of plants. Their philosophy and techniques may be transferred to other farmers, who also are trying to adapt, change or create new environments to meet their needs.

Most Salvadorans refer to traditional agriculture as the one that started the development of cash crops like coffee, cotton, and sugar cane. Due to the decline in the importance of these cash crops on the international market, large agricultural corporations talk about the need to move from the cultivation of traditional crops (coffee and sugar cane) to the production of a variety of plants that could meet environmental world market demand. However, large agricultural corporations often are unable to consider holistically the way natural laws interrelate or interconnect when plants are produced through agriculture. Seeds-plants, soil, water, and minerals are essential for food production and have suffered a negative impact from modern beliefs and

values around agriculture, and by new planting procedures, fertilizers herbicides, and pesticides. Moreover, large-scale agriculture is market-oriented based on mono cropping, urbanisation is increasing and continue leading to deforestation, many medicinal and nutritional plants used by ancestors are in danger of extinction; and, the knowledge or culture associated with those plants is also in danger of disappearing (see Chapter Two). It is the indigenous knowledge about farming and farming procedures that seems to more accurately relate plants to natural laws that more likely can help Salvadorans to improve their living conditions, preserving natural resources for future generations (see Chapter Seven), thus the relevance of this study for Salvadorans.

Combining research and development, using EPAR, I found that people and biological diversity are the main resources to sustain community development in El Salvador. On the one hand, linking biodiversity with micro-business presents itself as a good combination to create an alternative way of life that will sustain food production, income generation, and environmental protection. “The seeds born from the germ ‘terminator’ are sterile. According to some catastrophic scenarios this genetic material could cross with wild relatives and extend itself among the other species to suddenly leave sterile the whole native flora.” (Menjivar & Sermeño, 2000, p. 24). On the other hand, the understanding of nature, the changes in family relationships, and the openness to other cultures, presented in the daily lives of research participants (see Chapter Seven), are the seeds or germs of an alternative agricultural system in El Salvador. This change is highly needed to re-structure the economic system in El Salvador for it to have healthier families and communities.

One of the more innovative outcomes of the research is that research participants ended up with new capacities and with concrete ideas about how to use the information collected for their own development in order to meet their own objectives. They re-structured, and are continually re-structuring, their ways of life and work in order to be able to meet most of their needs within the Salvadoran context using their believes and knowledge about families, farming and plants uses. Their plans (see Chapter Seven) reveal their intention to share their knowledge and experiences with others so that all may achieve the same and together actively participate in

the creation of healthier ecosystems for present and future communities. The findings/results of the research/development project as a whole and its impact on participants' ways of life, made the experience valuable and rich.

Some of the evaluation criteria that may help the reader to understand the richness of this experience are related to the participants' ability to create sustainability. This can be measured by the following factors:

- The formation of a North-South network among Balsam, Urban Agriculture Network, GI, and Grass-Roots Eco-Initiatives. This group has already obtained funding to continue the process through the Building on Biodiversity project.
- The documentation of the national context and formation of a research committee whose goal is community development. Both people and information are basic resources to continue creating new community development initiatives.
- The commitment of participants to continue the project by enhancing their skills and abilities, and increasing their IK, thus continuing to create new knowledge. This was expressed in concrete actions for development designed during the research/development process.
- The changes observed in participants' behaviours and attitudes during the process, which reveals:
 - Willingness to share their knowledge and approaches
 - Empowerment to act, trusting their own abilities to find new ways to:
 - Share their IK, beliefs, philosophies, and approaches
 - Create new community development initiatives
- The commitment to preserve natural resources in the most varied of possible ways, using their IK and the EPAR model.
- The creation of innovative community development initiatives that link research and development, thus continuing to improve their IK by creating new knowledge.

Recommendations

For Future Research to Promote Development

The need to find alternative ways to meet Salvadoran needs was perceived by the research/development participants, and this research/development project was an incentive for them, and for the NGOs involved in looking for potential solutions centred in the well being of all people. However, while these research/development finding/results could be useful in designing urban agricultural projects to support the poorest of the poor, there are still many aspects to be investigated in El Salvador. The following topics I consider important to create new knowledge for further urban agriculture development.

1. Research participants have succeeded conserving biodiversity and soil fertility on small plots of land, but have not been able to produce enough food or generate enough income to have healthy families. An extension of their urban farming is needed and consequently, access to land is also needed. However, there is not enough land in El Salvador for all farmers, so changes in land ownership seem not to be a viable solution to address poverty. Aspects such as credit access, technical assistance, and agricultural product prices need to be explored (“Situación de la tenencia”, 1999). These aspects are already being taken into consideration within Balsam and other NGOs’ developmental projects. Research about the extent of the correlation of each aspect as a success factor in urban farming would better inform the developmental initiatives.
2. To research participants, the challenge is to extend agriculture to urban areas using ecological participatory approaches and biodiversity of plants. Both urban and rural agriculture will require land reclamation and water management. The findings of this research may inform developers about soil reclamation, but not about water management. Research on water availability and sustainable distribution systems is needed.
3. Salvadoran biodiversity is the key resource for a new kind of agricultural process which will involve support from all socio-cultural, natural, and ecological sciences (“Estrategia

nacional”, 2000). Research on biodiversity is needed. This includes an inventory of plants and their uses as well as content analysis of the chemical content of each kind of plant.

4. EPAR helped participants not only to believe their experiences are valuable for other small farmers who want to create healthier ecosystems, but also to start sharing their experiences nationally and internationally and in doing so, participating in activities that can create alternative ways for their own development. The information documented sets up the basis for further scientific research and for community development through urban agriculture. “Traditional ecological knowledge can provide qualitative knowledge which parallels scientific knowledge and can even suggest new areas of research” (Lewis, 1993, p. 11). However, the research must seriously consider the socio-cultural and environmental context of the site studied. “Some scientists behave as if it were possible to pluck information relating to their specialisms out of cultural context and treat it as independent technical facts. We need to establish that it is dangerous to do this and demonstrate the importance of understanding environmental interactions and development opportunities within their sociocultural context” (Sillitoe, 1998, p. 228).
5. The research/development findings/results from the present study can help small farmers to sustain soil fertility and conserve biodiversity of plants for the development of micro-business. However, urban agricultural micro-businesses is more than those two resources and more than just the use of IK in urban farming. Knowledge and technology interchange between North and South is needed. New research can produce relevant information to explore North-South innovative development initiatives.
6. Traditional knowledge is still present in El Salvador and used to preserve natural resources in urban farming as it is easy to manage family gardens. However, the agricultural and environmental conditions in El Salvador urge the documentation of traditional knowledge related to extensive farming. More extensive agricultural indigenous knowledge research is needed.

7. Current social and economic conditions in El Salvador urgently require new ways of community development for which IK and the EPAR research model might provide the answer. New research might find new elements to complement these research findings and offer better solutions to poverty and environmental problems. Researching the applicability of EPAR to search for the IK in the production of natural dyes in El Salvador might be relevant. This is a field already in place in El Salvador and the connections between Salvadoran ONGs and the University of Alberta were established by two Human Ecology Professors at the U of A.
8. EPAR is a model that emphasizes the need for North-South partnerships. Researching its applicability in the North might be needed. It is also important to determine whether EPAR can be easily used when projects and/or partnerships are already in place.

For Policy Change

1. Environmental and poverty problems are deeply interconnected. The uncontrolled use of natural resources to produce wealth for a few has caused the depletion of the environment and poverty for the majority. In this way, I recommend governments and international funders to look for solutions to environmental problems that include solutions to poverty problems to really be able to get the desired results.
2. One of Balsam's goals is to help urban micro-entrepreneurs use their agricultural knowledge to develop plant based micro-business as a solution to environmental and poverty problems. I recommend to them or any NGO, that they support families of urban and rural communities to produce nutritional food for personal use and to develop plant based micro-business for income generation. In this way, they will be addressing poverty and environmental problems, such as:
 - Biodiversity conservation
 - Soil reclamation

- Waste reduction and management
- Available water administration

They will also meet their own subsistence problems, such as:

- Food production: using an agro-ecological perspective in urban areas will contribute to the sustainable use of natural resources.
 - Biodiversity protection: using diverse food, industrial, religious, herbs, and ornamental plants will facilitate biodiversity protection, rescuing plants in danger of being extinct.
 - Soil reclamation and conservation: using organic fertilisers, pesticides, and herbicides, will help to meet waste problems, reducing also environmental contamination
 - Water contamination: the implementation of new irrigation family and community methods will facilitate the rational use of available water and its de-contamination.
3. I also recommend that NGOs, communities, and funders use EPAR techniques as the basic tool for working with people. EPAR will allow participants to integrate the complementary spiritual and physical actions: awareness raising, organization, education, research, production, and marketing. It will also allow the interconnection of the different actors: NGOs, Community organizations, supporters, and beneficiaries. In other words, the approach will help them build connections, explore community strengths and weaknesses, and examine opportunities and barriers to community development based on plants and their uses. Initiatives will emerge from this process and will be fully 'owned' by the community itself, and more likely to succeed than solutions imposed from outside.

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Appendix 5.1

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ENVIRONMENTAL SITE ASSESSMENT
OF FOUR GARDEN PLOTS
IN
SAN SALVADOR, EL SALVADOR

by Sheila Luther

April-May, 2000

Edmonton, Alberta

1.0 INTRODUCTION

This report is the result of an exploratory project conducted as part of an overall project entitled Building on Biodiversity (BOB). A proposal for this project was submitted to the Canadian International Development Agency (CIDA) in December, 1999. Approval for the project from CIDA was obtained in March, 2000. This report addresses one goal of the project which was to carry out a limited environmental assessment of some waste land in San Salvador. The purpose of this assessment was to determine what resources will be required to reclaim the plots into productive garden land.

The scope of work for this part of the project included the following steps:

- Select several parcels of land to serve as possible demonstration gardens in San Salvador.
- Conduct site visits and interview local residents regarding the recent history and ownership of the site.
- Conduct a field assessment involving soil sampling at sites where the recent history and site visit indicate there is a potential for soil contamination.
- Submit samples collected to a testing laboratory for analysis. Depending on the type of analysis conducted some analyses were conducted by a Salvadorean laboratory, while others were conducted by a laboratory in Edmonton, Alberta, Canada.
- Prepare a report documenting the results of the assessment and providing recommendations for further work required at each site.

2.0 METHODS

Sites were selected for this study by weighing both the potential for the land to be appropriate for a gardening project, and support and interest within the community. The site selection was completed in May, 2000 by Xenia Pereira of Intercambios, a nongovernmental organization in

San Salvador. This work was completed prior to the visit of a Canadian volunteer, Sheila Luther, a Soil Scientist, who conducted the environmental assessment with the assistance of Xenia Pereira, and Emna Victoria Garcia, a local agronomist.

A site visit was conducted on April 23, 2000. During the site visit a representative of each community was interviewed regarding the recent history and ownership of the potential garden plot. Photographs of each site were taken. Other issues including security of site and the availability of water and other inputs were discussed.

A soil assessment was conducted at each site that was deemed to have potential sources of contamination. Of the four sites visited, three were selected for a more detailed assessment. In the assessment, soils were sampled at one or more point locations considered to be the worst case location(s) for potential contamination. Sampling was conducted with a shovel and a 2" diameter soil auger. Sampling depths were usually 0-15 cm, 15-30 cm, 30-60 cm, 60-100 cm except where there were distinct horizons and in this case each horizon was sampled separately. In addition to point sampling, a composite surface soil sample was collected at each site. At larger sites, the site was divided in half and a surface composite was collected from each half. At smaller sites, a surface composite was collected from a grid pattern over the entire site. During sampling, the soil was described on borehole logs using the Canadian System of Soil Classification (Agriculture Canada Expert Committee on Soil Survey, 1998).

Select soil samples were sent to Enviro-Test Laboratories in Edmonton, Alberta, Canada for analysis of trace elements and or salinity parameters. Select soil samples were submitted to Procafe Laboratorio de Servicios Analiticos in San Salvador, El Salvador for the analysis of fertility parameters. The methods used by each laboratory are included with the original laboratory data sheets provided in Appendix A.

3.0 RESULTS

The four potential garden sites visited were in the following communities:

- La Mireya (Northeast San Salvador)
- La Isla (North central San Salvador)
- Arenales (North of San Salvador)
- San Jose Cortez (North of San Salvador)

In this report each potential garden site will be referred to by the community name. The results will be summarized by location.

The laboratory results are summarized in Table 1 and original laboratory data sheets in Appendix A. A sketch of each site is included in Appendix B. Borehole logs are included in Appendix C.

Laboratory results were compared with the Tier I criteria (Alberta Environmental Protection, 1994) and the Canadian Council of Ministers of the Environment (CCME) Agricultural criteria (CCME 1999).

3.1 La Mireya

- Size of Site: - Approximately 150 m².
- Current Land Use: - Site is the backyard of a residence. Approximately 100 m² is currently used for gardening, mainly for Aloe Vera. This Aloe Vera is used to produce medicinal products by a group of five women in the community. Other plants in the 100 m² area

include: avocado, papaya, and squash. The remainder of the site is not currently used for gardening.

Ownership:

- Private community member.

Other Community

Initiatives:

- Group of five women involved in growing herbs and producing medicinal products and some cosmetics, shampoos, etc.

Received support previously from a local nongovernmental organization (NGO). Only one home, the one visited, currently has gardening taking place. The site has been amended by organic compost. After a series of amendments the large avocado tree in the garden began to produce fruit.

Sample Results:

- No samples were collected from this site as there was no indication of a history of contamination at this site.

Advantages of Site: /

- Already a productive site; good potential as a demonstration site.

- Site is a good example of combining microindustry with urban gardening.

- Site is already fenced and therefore protected from domestic animal predators.

Disadvantages of Site:

- Small size.

- Quite a bit of shade in area from large trees including avocado.

Recommendations for Site:

- No further sampling or remediation work was indicated from this assessment.

3.2 La Isla

- Size of Site: - Approximately 2300 m².
- Current Land Use: - Site is a drainage basin in the community. This site may have been a river bed at one time but the water was diverted from the area either through underground pipes or an above ground diversion. The site is currently in grasses, sedges and some trees. There are a few banana trees through the middle. There are some areas where garbage has been disposed and there is some debris buried in the soil throughout the area.
- Ownership: - ANDA, the water company for San Salvador.
- Other Community
- Initiatives: - The community is has active local organization. There is high interest in this type of project in this community. Many in the community grow some ornamental plants around their homes and therefore have some experience in gardening. Previously there was a hydroponics project in this community and so there may be some knowledge of this type of plant production. Other experience in the community includes an individual who worked in plantation farming in Mexico.
- Sample Results: - Although the soil contained debris, in much of the area there remained a distinct topsoil layer of sandy loam to loam texture. The site was much moister than other sites examined. Two point sample locations and two composite samples were collected from this site. All samples met the CCME criteria for agricultural soils for trace metals. Zinc was elevated over the Tier I criteria at two sites. The point sample #2 collected from

the base of this site was higher in organic carbon and nitrogen than most of the samples evaluated in this study overall.

Advantages of Site:

- Community interest.
- Productive soils encountered in area.
- Large area.
- Site is naturally moist and additional water should be available if ANDA supports the project.

Disadvantages of Site:

- Quite a bit of shade, mainly because situated in a deep valley.
- Possibly underground lines in the area.
- Necessary to negotiate with ANDA to be able to use the site.
- Possibly could be too wet during some parts of the year.

Special Note:

- After this assessment, this community was affected by an explosion at a nearby military base. A number of people were injured and it is thought that the soil in the area may now be contaminated. This will require further evaluation if the project is to proceed at this site.

Recommendations:

- Site needs to be re-evaluated prior to further work because of the recent explosion as described above.

3.3 Arenales

Size of Site:

- Approximately 240 m².

Current Land Use:

- Site is an unused parcel of land between two homes in the community. The site is currently in grasses and trees including banana and papaya. The site was planted to cassava last year and bore a good crop. There was a small amount of garbage disposed at site including a few D size batteries.

Ownership:	- Private community member.
Other Community	
Initiatives:	- The community has an active local organization. There is interest in this type of project in this community. The owner of the potential garden plot has more land near his house where fruit are grown and sold in the market. The owner has 50 years experience farming in the San Salvador area.
Sample Results:	- One point sample location and one composite sample were collected from this site. All samples met the CCME criteria and the Tier I criteria for agricultural soils for trace metals. The soil was a fine loamy sand to fine sandy loam texture and lacked rocks.
Advantages of Site:	- Community interest. - Community experience in gardening. - Productive soils encountered in area. - Water is said to be available in this community.
Disadvantages of Site:	- Quite a bit of shade; some unproductive trees should be removed (this was suggested by the landowner).
Recommendations:	- Other than surface clean-up of garbage, no further soil sampling or remediation work is indicated from these results.

3.4 San Jose Cortez

Size of Site:	- Approximately 265 m ² .
Current Land Use:	- Site is an unused parcel adjacent and downslope from a home. The site is currently in grasses, izote and trees including banana and mango. There was a small amount of garbage disposed at

site including a few D size batteries. The site also receives drainage from the clothes washing area of the site.

Ownership:

- Private community member.

Other Community

Initiatives:

- The community has an active local organization including a local environment group. There is interest in this type of project in this community. The community has other local projects including a carpentry project. The plan is to compost the wastes from the carpentry project. The first batch of compost is currently being made.

Sample Results:

- Two point sample locations and one composite sample were collected from this site. The point samples came from one area with a D size battery (sample #1) and from the drainage area from the clothes washing area (sample #2). All samples analyzed for trace metals met the CCME criteria for agricultural soils and the Tier I criteria. The soil was undisturbed and had well-defined topsoil of fine sandy loam to silt loam.

Advantages of Site:

- Community interest.
- Community experience in gardening and composting.
- Good supply of raw material for composting in area.
- Productive soils encountered in area.

Disadvantages of Site:

- Some waste waters drain into the plot of land.
- Water supply in this area is erratic and unreliable.

Recommendations:

- Other than surface clean-up of garbage, no further sampling or remediation work is indicated from these results.

4.0 GENERAL OBSERVATIONS REGARDING GARDEN PLOTS

There are some common issues for all plots and they are listed below:

- Security is a concern in shared areas, however within communities it is possible to have neighbours watch over the area. This seems to be quite effective within each community. There is also the concern that local domestic animals may cause damage in gardens. The gardens may have to be fenced off from animals such as chickens, which are abundant in most of the communities visited.
- Water is scarce in San Salvador and in some communities the supply of water is erratic. It may be necessary to look into ways of trapping and storing rain water for some sites.
- The soils are easily degraded in the tropical climate and so it is necessary to maintain fertility through addition of organic amendments. Ways to obtain organic amendments need to be developed. Composting is one option but of course the necessary blend of amendments would be required.
- Seed for gardening may not be easily obtained in San Salvador. This needs to be investigated further and sources of seed appropriate for the conditions in San Salvador need to be found.
- Further work is required to determine which plants would be appropriate for each garden area. Insects and other pests may pose a limitation for some species in some areas.

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Appendix 6.1
Plants Cultivated by Juanita and her Family

ORNAMENTAL PLANTS			NUTRITIONAL PLANTAS			MEDICINAL		
Spanish name	English name	Scientific name	Spanish name	English name	Scientific name	Spanish name	English name	Scientific name
1. Ho-de-ja pecho			1. Agua-cate	Avocado	<i>Persca americana</i>	1. Alta-miza	Cuman ragweed	<i>Ambrosia cumanensis</i>
2. Cla-vel	Carnation	<i>Malvaviscus brevipes</i>	2. Ayote	Crookneck squash, winter squash	<i>Cucurbita moschata</i>	2. Chi-chipince	Scarletbush	<i>Hamelia patens</i>
3. Rosa	Rose		3. Anona blanca	Ilama	<i>Annona diversifolia</i>	3. Duerme lengua	Doll's-eyes, white baneberry	<i>Actaea alba</i>
4. Ve-ranera	Rose		4. Cacao	Cacao	<i>Theobroma cacao</i>	4. Epa-zote	Mexican tea, wormseed	<i>Chenopodium ambrosioides</i>
			5. Cu-champer		<i>Gonolobus salvinii</i>	5. Hier-ba buena de menta	Water mint	<i>Mentha citrata</i>
			6. Chile picante	Cayenne pepper, sweet peppe	<i>Capsicum annuum</i>	6. Oregano	Mexican oregano, scented matgrass	<i>Lippia graveolens</i>
			7. Guineos	Banana	Musa spp.	7. Sábila	Aloe vera, Barbados aloe	<i>Aloe vera</i>
			8. Guisquil	Chayote	<i>Sechium edule</i>	8. Salvia		<i>Buddleja americana</i>
			9. Papa-malanga			9. Tem-pate	Barbados nut, purging nut, pulza	<i>Jatropha curcas</i>
			10. Hier-ba mora	American black nightshade, apple of Sodom	<i>Solanum americanum</i>	10. Tigui-lote	White manjack	<i>Cordia alba</i>
			11. Paca-ya		<i>Chamaedorea tepejilote</i>			
			12. Plátano	Plantain	<i>Musa acuminata</i>			
			13. Tomates nativos	Pear tomatoes	<i>Lycopersicum esculentum</i>			

Appendix 6.2
Plants Cultivated by Tránsito and her Family

ORNAMENTAL PLANTS			NUTRITIONAL PLANTAS			MEDICINAL		
Spanish name	English name	Scientific name	Spanish name	English name	Scientific name	Spanish name	English name	Scientific name
1. Clavel sencillo	Carnation	<i>Malva viscus brevipes</i>	1. Ayote	Crookneck squash, Canada pumpkin, winter squash	<i>Cucurbita moschata</i>	1. Altamiza	<i>Cuman ragweed</i>	<i>Ambrosia cumanensis</i>
2. Gemelas			2. Berenjena	Eggplant, aubergine, brinjal, mad apple, jew's apple	<i>Solanum melongena</i>	2. Balsamo	Balsam Tolu of	<i>Myroxylon balsamum</i>
3. Izora			3. Cafe	Arabian coffee	<i>Coffea arabica</i>	3. Champur		<i>Gonolobus salvinii</i>
4. Rosa	Rose		4. Chile picante	cayenne pepper, sweet pepper	<i>Capsicum annuum</i>	4. Curarina or Espada del diablo		
5. Pochote	Pochote	<i>Ceiba aesculifolia</i>	5. Chile criollo	Pepper	<i>Capsicum baccatum</i>	5. Chichipince	Scarletbush	<i>Hamelia patens</i>
			6. Chufle	Salvadorian pepper	<i>Calathea macrocephala</i>	6. Diente de León o Valeriana	Parential herbs	<i>Valeriana spp.</i>
			7. Granadilla pacifera	Fetid passionflower, love-in-a-mist, running pop, wild water lemon	<i>Passiflora foetida</i>	7. Epacina	Guinea henweed	<i>Petiveria alliacea</i>
			8. Guineo majoncho indio	Native banana	<i>Musa sp.</i>	8. Epazote	Mexican tea, wormseed	<i>Chenopodium ambrosioides</i>
			9. Guineo majoncho felipa	Banana	<i>Musa sp.</i>	9. Genjibre	Garden ginger, common ginger, Canton ginger, stem ginger	<i>Zingiber officinalis</i>

Appendix 6.3
Plants cultivated by Virginia and her family

ORNAMENTAL PLANTS			NUTRITIONAL PLANTS			MEDICINAL		
Spanish name	English name	Scientific name	Spanish name	English name	Scientific name	Spanish name	English name	Scientific name
1. Ampel	Corn poppy	<i>Papaver rhoeas</i>	1. Agua-cate	Avocado	<i>Persea americana</i>	1. Chula o mulata	Madagascar periwinkle	<i>Catharanthus roseus</i>
2. Narciso	Oleander	<i>Nerium oleander</i>	2. Chile picante	Cayenne pepper; sweet pepper	<i>Capsicum annuum</i>	2. Chichipince	Scarletbush	<i>Hamelia patens</i>
3. Pascua	Poinsettia, Christmas flower, painted leaf, lobster plant, Mexican flameleaf	<i>Euphorbia pulcherrima</i>	3. Guineano	Banana	<i>Musa spp.</i>	3. Hierba de buena menta	Water mint	<i>Mentha citrata</i>
			4. Guisquil	Chayote	<i>Sechium edule</i>	4. Hoja del golpe	Wild crapemyrtle, Barbados cherry	<i>Malpighia glabra</i>
			5. Hierba mora	American black nightshade, apple of Sodom	<i>Solanum americanum</i>	5. Paraíso	Chinaberrytree, bead tree, Persian lilac, pride of India	<i>Melia azedarach</i>
			6. Limón	Lime, key lime	<i>Citrus aurantiifolia</i>	6. Pie de niño	redbird flower, Jacob's ladder, ribbon cactus	<i>Pedilanthus tithymaloides</i>
			7. Loroco	Loroco	<i>Fernaldia pandurata</i>	7. Ruda	Common rue	<i>Ruta graveolens</i>
			8. Madre-cacao	Quickstick	<i>Gliricidia sepium</i>	8. Sabila	Aloe vera, Barbados aloe	<i>Aloe vera</i>
			9. Marañón	Cashewnut	<i>Anacardium occidentale</i>	9. Tempalte	Barbados nut, physic nut, purging nut, pulza	<i>Jatropha curcas</i>
			10. Pepino	Cucumber		10. Zacate limón	Lemon grass	<i>Cymbopogon citratus</i>

Appendix 6.4

Inventory of Plants Cultivated and Used by the Research/Development Participants

210 varieties of plants, 89 food and nutritional, 68 medicinal, and 53 ornamental, are cultivated by the nine families that participated in this research. The following 64 plants are the most commonly used and processed into medicines or cosmetics.

Spanish/English name	Scientific name	Use
Albahaca montes, albahaca de castilla, or cimarrona / <i>Ocimum</i>	<i>Ocimum campechianum</i>	Digestion, ear ache, athlete's foot, mosquito repellent
Alcotan / Pareira Brava	<i>Cissampelos pareira</i>	Diarrhoea
Ajo / Cultivated garlic	<i>Allium sativum</i>	Nervous, tension, and parasites
Altamiza / Cuman ragweed	<i>Ambrosia psilostachya</i>	Menstrual problems and gases
Amor seco		Vagina problems
Balsamo / Balsam of Tolu	<i>Myroxylon balsamum</i>	Parasites
Barbona o raíz de miona / False ironwort	<i>Hyptis capitata</i>	Arthritis, urinary and menstrual problems (roots) Eyes (base of the flower)
Baja leche / Ixbut	<i>Euphorbia lancifolia</i>	Women's milk production for the baby
Botella o camote de maravilla / sweet potato	<i>Ipomoea batatas</i>	Uterus
Cuchamper	<i>Gonolobus salvinii</i>	Stomach
Cojon o huevo de toro	<i>Stemmadenia obovata</i>	Fungi
Cordoncillo / Spanish elder	<i>Piper tuberculatum</i>	For a quick delivery, tension, heart, laryngitis.
Cacahuillo / Purple scalystem	<i>Elytraria imbricata</i>	Tooth ache
Cinco negritos / South American lantana, tropical shrub verbena	<i>Lantana camara</i>	Fever
Curarina o Espada del diablo		Insects and snake bites.
Chichipince* / Scarletbush	<i>Hamelia patens</i>	Cauterize
Chula o mulata / Madagascar periwinkle	<i>Catharanthus roseus</i>	Modalities
Diente de León o Valeriana / Perennial herbs	<i>Valeriana sp.</i>	Muscle aches
Duerme lengua / white cohosh, doll's eye,	<i>Actaea alba</i>	Anaesthesia
Epacina o zorillo / Guinea henweed	<i>Petiveria alliacea</i>	Sinusitis, constipation, asthma, parasites
Epazote, apazote, ipazote / mexican tea, wormseed	<i>Chenopodium ambrosioides</i>	Parasites, headache, antiviral
Friegaplatos / potato tree	<i>Solanum elaeagnifolium</i>	Gastritis.

Floripundia o reina de la noche / angelsteers	<i>Brugmansia suaveolens</i>	Liver and kidney
Gavilan o golondrina / Albizia	<i>Albizzia sp.</i>	Parasites
Genjibre / garden ginger, common ginger, canton ginger, stem ginger	<i>Zingiber officinalis</i>	Cough. Arthritis. Spice for a drink
Guaco / pelican flower	<i>Aristolochia grandiflora</i>	Diarrhoea
Guarumo	<i>Cecropia sp.</i>	Oedema
Guarumo colorado / Pumpwood	<i>Cecropia peltata</i>	Gases, quick delivery, fevers
Hierba buena de menta / water mint	<i>Mentha citrata</i>	Bad breath
Hierba del susto / woodland water willow	<i>Justicia carthagenensis</i>	Nerves
Hoja del golpe	<i>Malpighia glabra</i>	Bruises, wounds
Hoja del aire / cathedral bells,; air plant, life plant, floppers, Mexican love plant, curtain plant, mother-in-law, good luck leaf, miracle leaf, sprouting leaf	<i>Kalanchoe pinnata</i>	Ache, swallow
Huehuechita o guacuco	<i>Eugenia guatemalensis</i>	Head ache
Incienso de parra / Mexican white sagebrush	<i>Artemisa ludoviciana ssp. mexicana</i>	Ulcers
Jote / gumbo limbo	<i>Bursera simaruba</i>	Kidney
Madrecacao o cacahuananse / quickstick	<i>Gliricidia sepium</i>	Itching. It is also pesticides and fertilizer.
Maquilisgue-Macuilizhuat / Pink trumpet tree	<i>Tabebuia rosea</i>	Contraception
Matial	<i>Pereskia lychnidiflora</i>	Fever
Mejorana o hierba de pino / tropical whiteweed	<i>Ageratum conyzoides</i>	Cough, flu
Mirra o lomonzillo / orange jessamine	<i>Murraya exotica</i>	Rheumatism and arthritis
Mirto / myrtle	<i>Myrtus communis</i>	Tooth ache
Oregano / Mexican oregano, scented matgrass	<i>Lippia graveolens</i>	Condiment. Bruises.
Oreja de tunco o cola de pavo		Yeast infection
Ortiga menor o caliente rastrero		Cancer
Paraíso / Chinaberry tree, bead tree, Persian lilac, pride of India	<i>Melia azedarach</i>	Asthma, tuberculosis
Pico de pato	<i>Amphilophium molle</i>	Diarrhoea
Pie de niño / Redbird flower, Jacob's ladder, ribbon cactus	<i>Pedilanthus tithymaloides</i>	Prevent diseases in poultry.
Pino blanco	<i>Pinus occidentalis</i>	Cramps

Quina	<i>Coutarea hexandra</i>	Infections and malaria
Ruda / common rue	<i>Ruta graveolens</i>	Earache, menstrual ache, and stomach ache. Kill lice.
Sabila* / Barbados aloe, aloe vera	<i>Aloe vera</i>	Wounds. Shampoo, soap
Salvia-Salviona	<i>Buddleja americana</i>	Head ache. Flatulence.
Salvia santa / Yerba dulce, Mexican lippia	<i>Lippia dulcis</i>	Stomach ache, head ache
Santa María / Baquina	<i>Lepianthes umbellata</i>	Disipela, head ache
Saúco amarillo / yellow trumpet bush; dessert willow	<i>Tecoma stans</i>	Flu, fever, eyes.
Sauco / Mexican elder	<i>Sambucus nigra</i> spp. <i>canadensis</i>	Anaemia, avoid vomiting, Fever
Siempre viva / Jacob's bush	<i>Iresine diffusa</i>	Cancer, vaginal bleeding
Suelda con suelda / Ceylon spinach, Indian spinach	<i>Basella alba</i>	Burns, dislocation
Suquinai o siguapate / sweetscent	<i>Pluchea odorata</i>	Stomach ache, colic
Talía / clammy false oxtongue	<i>Blumea viscosa</i>	Tuberculosis, asthma
Tempate / Barbados nut, physic nut, purging nut, pulza	<i>Jatropha curcas</i>	Herpes or <i>timpirinchi</i> , amoebas
Tiguilote / white manjack	<i>Cordia alba</i>	Cough
Pipian/field punpkin/outlimn punpkin/autumn squash/vegetoide marrow/zucchini/cougette	<i>Cucurbita pepu</i>	Nutritional
Verbena / John Charles	<i>Hyptis verticillata</i>	Head ache and fever

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